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Research Article

Moth flies (Diptera, Psychodidae) of Estonia

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Abstract

A fundamental prerequisite for understanding and protecting biodiversity is the construction of a high-quality faunal database. The primary objective of this study was to address knowledge gaps in the biodiversity of the family Psychodidae in Estonia. Faunistic data on 45 species of moth flies (Diptera: Psychodidae) from Estonia are presented, including 30 new country-records. Sixteen species are considered important for nature conservation. An updated checklist of the family, comprising 71 species, is provided for the Baltic countries. Habitus photographs of selected Estonian species are also included.

Key words: Baltic countries, biodiversity, checklist, new records, Palaearctic Region, Psychodinae, Sycoracinae, Trichomyiinae

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Introduction

The moth flies (Diptera: Psychodidae) are relatively well-represented in the Palaearctic Region, with nearly 800 known species (e.g., Wagner 1990, 2018; Evenhuis et al. 2007; Salmela et al. 2014). Although, the Baltic countries belong to an area where the biodiversity of the family Psychodidae has only been superficially studied. According to Pakalniškis et al. (2006), 41 species are known in Lithuania, while Latvia, on the other hand, remains almost entirely unexplored, with only one species recorded (Salmela and Vartija 2007). Likely due to their small size and the absence of a local specialist, the moth flies were largely excluded from earlier faunistic studies in Estonia. Only Remm (1956) named *Psychoda phalaenoides* (Linnaeus, 1758) as occurring in Estonia. The first and, so far, the only list of species was published by Salmela and Piirainen (2005) for Viidumäe Nature Reserve in the Island of Saaremaa. They described a new species – *Lepimormia hemiboreale* Salmela & Piirainen, 2005 – and listed 14 additional species.

A large amount of moth fly material from various research projects has accumulated in the authors' possession over recent years. The aim of this study is to provide data on newly determined material, along with earlier published data on Estonian Psychodidae. Moreover, the list of moth flies of Baltic countries is presented.

Materials and methods

A large proportion of the material was collected from forest habitats using trunk window traps (Fig. 1A, B; abbreviated as TWT; for details see Süda (2009) and Sammet et al. (2016)). Additional material was collected using Malaise traps (Fig. 1C, D; abbreviated as MT; for details see Takkis et al. (2018) and Šikora et al. (2020)). A few specimens were collected by sweep netting or handpicking. The material was collected into ethylene or propylene glycol (in the case of TWT) or ethyl alcohol (in the case of MT, sweep netting, and handpicking). In total, material was collected from 45 localities throughout the country (Fig. 2). However, individual localities may assemble several nearby collecting spots, thus, exact geographical coordinates are provided for each sample in the studied material paragraphs.

Samples from all collection methods were sorted to order and family level prior to this study. The sorted Psychodidae specimens were stored in 70% ethyl alcohol, and the majority were identified directly under a stereomicroscope without slide-mounting. Specimens of particular interest that required detailed study were mounted on microscope slides with the following procedure: the specimens were cleared (diaphanized) using chloralphenol and subsequently treated in xylol. Cleared specimens were mounted on microscope slides using Canada balsam as the mounting media. Most of the samples were identified by the first author and were then deposited in the Insect Collection of the Institute of Agricultural and Environmental Sciences, Estonian University of Life Sciences, Tartu, Estonia (**IZBE**). Otherwise, several specimens marked with INS (= Inventory Slide Number of the family Psychodidae; see Tkoč et al. 2014) were identified by the last author. This material is deposited in the National Museum, Prague, Czech Republic (**NMPC**). Habitus photographs of selected Estonian species were compiled using LAS X software from multiple gradually focused images taken in alcohol medium by a Leica K5C camera attached to a Leica 205C stereomicroscope (see also Kjærandsen et al. 2022).

The following identification keys were used: Vaillant (1971–1983); Szabó (1983); Withers (1989a, b) and numerous unnamed original papers with descriptions of new species (e.g., Ježek 1977, 1983, 1984, 1985, 1990). The nomenclature is modified from Vaillant (1971–1983) and Wagner (1990, 2018) using the classifications of Ježek and van Harten (2005, 2009), Ježek (2007), Omelková and Ježek (2012a), Oboňa and Ježek (2014), Kvifte (2014), and Kroča and Ježek (2015, 2019, 2022). The following list of species was formatted based on similar lists from other European countries such as Ježek (2005), Oboňa and Ježek (2014), and Ježek et al. (2008, 2019, 2021b).

List of species

In the following list of species, the examined material is organized by counties from west to east and from north to south. The paragraph of the examined material is arranged as follows: county (highlighted in bold and not repeated for each sample), sample (male or/and female, without duplicates), collecting locality, geographical coordinates, collecting time range, collecting method (in case of TWT, followed by substrate tree species), collector, and INS (if material is deposited in the National Museum, Prague).

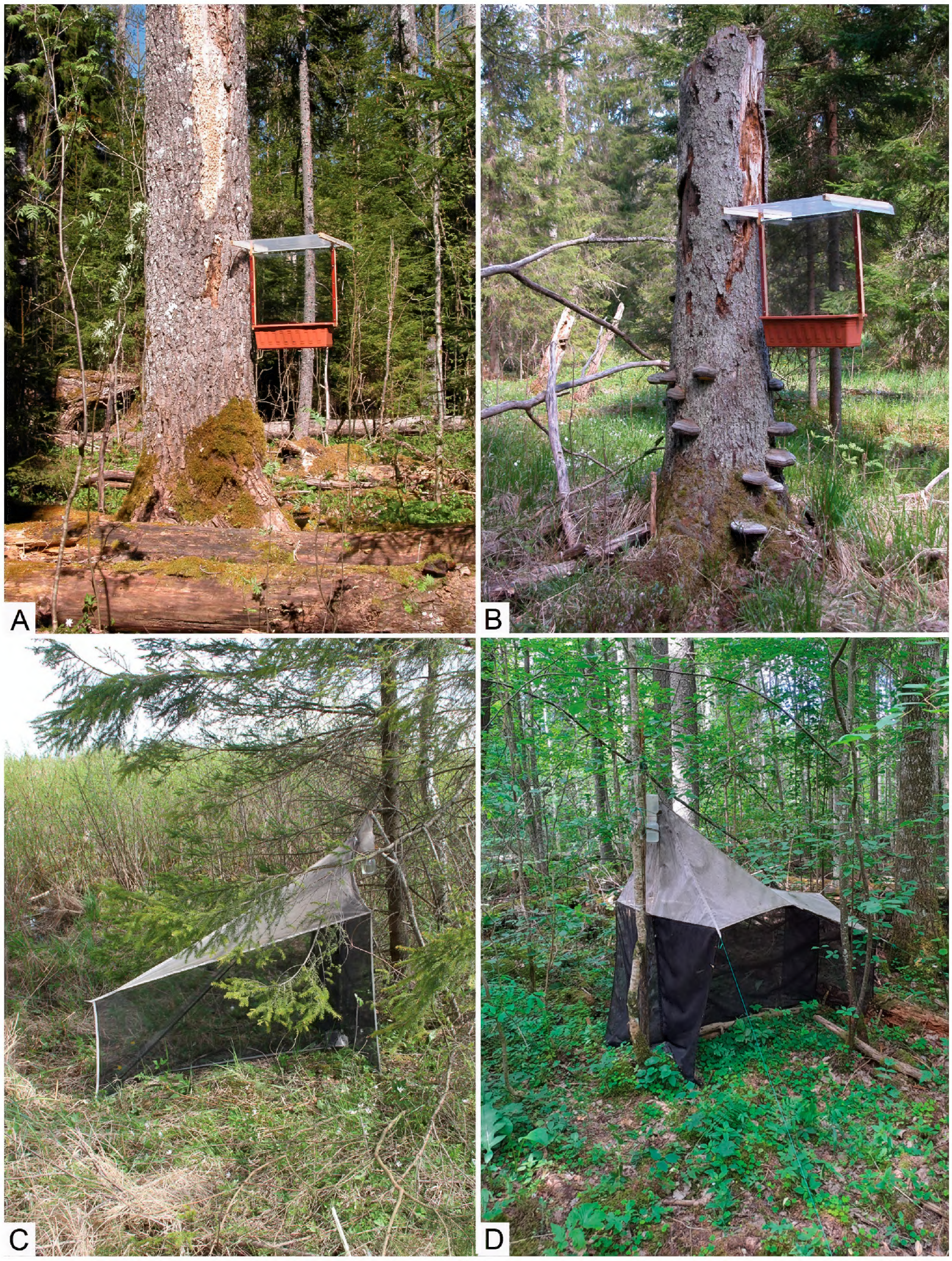

Figure 1. Collecting localities and the types of traps used **A** trunk window trap in Kalita NR (58°04'15"N, 24°51'37"E) **B** trunk window trap in Lahemaa NP (59°28'48"N, 25°54'24"E) **C** malaise trap near Lasila (forest patch No 75; 59°16'49.3"N, 26°13'05.2"E) **D** malaise trap in Vorbuse, Lokaatorite tee (58°25'27"N, 26°35'47"E). Photographs by IS (**A, B**), and OK (**C, D**).

The following abbreviations are used in the text: **LCA** – Limited conservation area, **MT** – Malaise trap, **NP** – Nature Park, **NR** – Nature Reserve, **PL** – Protected landscape, **TWT** – trunk window trap, ♂ – male, ♀ – female, **IS leg.** – Ilmar Süda leg., **OK leg.** – Olavi Kurina and Co. leg. An asterisk (*) before the species name indicates a new geographical record for Estonia.

The rarity level of each species (common, sporadically common, rare, etc.) is based on data from earlier literature, known distribution, and the abundance/frequency of the species across multiple studies. Literature sources for these

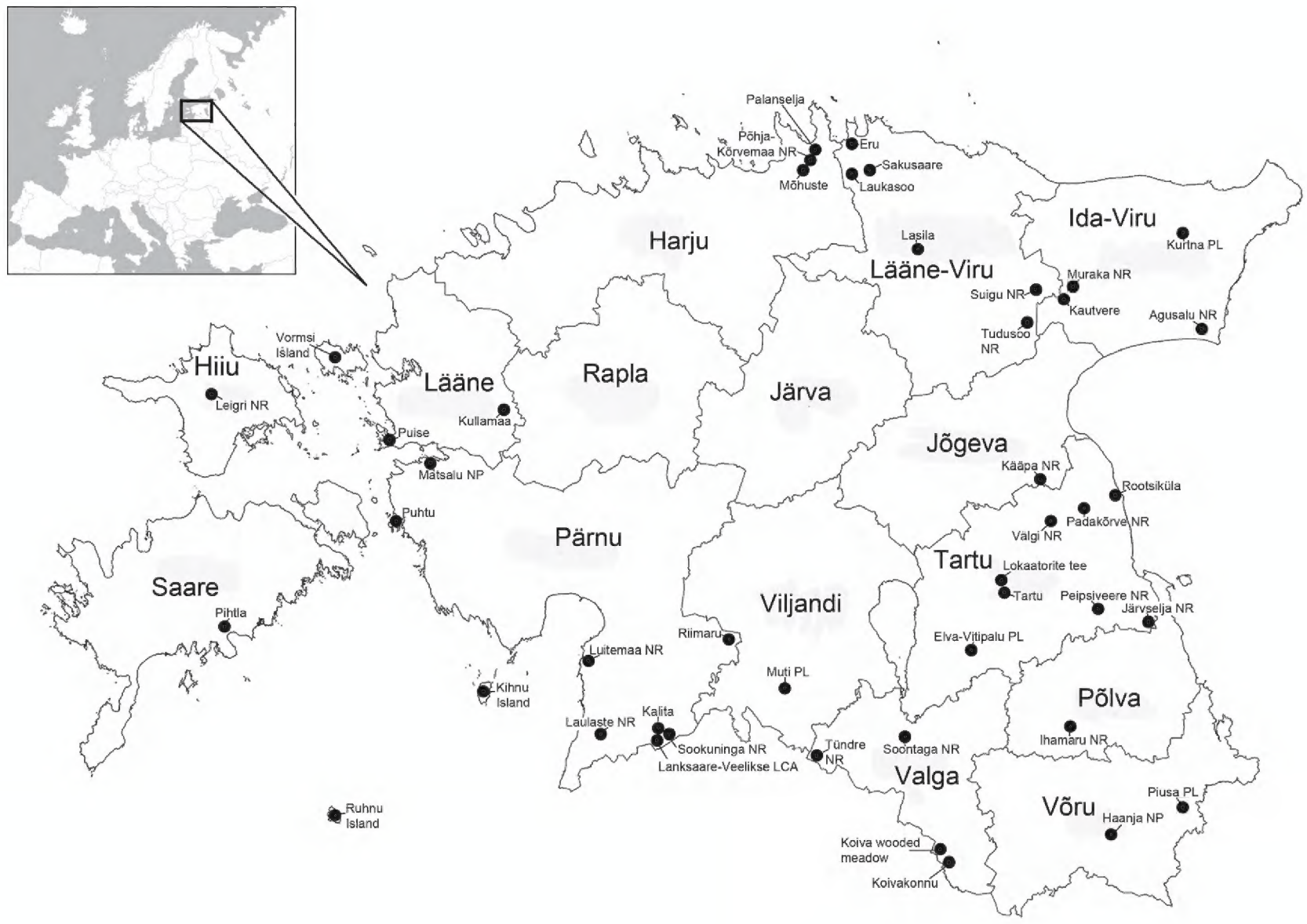

Figure 2. Map of Estonia showing counties (large font) and collection localities (small font). Retrieved and modified from https://geoportaal.maaamet.ee/eng/Spatial-Data/Administrative-and-Settlement-Division-p312.html (accessed 12 January 2024).

assessments are provided separately for each species. Species deemed important for nature conservation are those that are considered for conservation potential/status in other European countries (e.g., Ježek and Omelková 2012; Oboňa and Ježek 2014; Kroča and Ježek 2015, 2019, 2022; Ježek et al. 2019, 2021b). In accordance with IUCN categorization (IUCN 2024), these species are assessed in Czech Republic as critically endangered (CR), endangered (EN) or nationally scarce (NS). For more information, see Omelková and Ježek (2012b).

Classification and nomenclature for individual species are provided by Ježek and van Harten (2005, 2009), Ježek (2007), Ježek et al. (2018, 2020, 2021a, b, 2023a), Omelková and Ježek (2012a), Ježek and Omelková (2012), Oboňa and Ježek (2014), Kvifte (2014), and Kroča and Ježek (2015, 2019, 2022).

Family Psychodidae

Subfamily Sycoracinae

1. *Sycorax silacea* Curtis, 1839

Published record. Salmela and Piirainen (2005): 304.

Comments. European species, sporadically common (Ježek et al. 2020; Morelli and Biscaccianti 2021).

Subfamily Trichomyiinae

***2. *Trichomyia urbica* Haliday in Curtis, 1839**

Material examined. Läänemaa • ♂; Vormsi Island, Suuremõisa Park; 58°59'30"N, 23°11'34"E; 19.07.–19.08.2011; TWT (on old *Quercus robur* L.); IS leg. **Pärnumaa** • ♂; Kihnu Island; 58°08'44"N, 23°58'14"E; 29.05.–01.07.2011; TWT (on old *Aesculus hippocastanum* L.); IS leg.; • ♂; Matsalu NP; 58°42'41"N, 23°41'19"E; 11.07.–14.08.2009; TWT (on *Populus tremula* L.); IS leg.; • ♂; Lanksaare-Veelikse LCA; 58°00'11"N, 24°49'42"E; 24.07.–25.08.2017; TWT (on dead *Betula pendula* Roth); IS leg. **Valgamaa** • ♂; Soontaga; 58°00'03"N, 26°05'31"E; 05.06.–06.07.2015; TWT (on *Acer platanoides* L.); IS leg.

Comments. European and Transcaucasian species (Ježek et al. 2021a, b). Important species for nature conservation, assessed as critically endangered in the Czech Republic.

Subfamily Psychodinae

Mormiini
Mormiina

***3. *Oomormia andrenipes* (Strobl, 1910)**

Material examined. Lääne-Virumaa • ♂; Tudusoo NR; 59°04'47"N, 26°45'38"E; 28.05.–25.06.2017; TWT (on *Populus tremula*); IS leg.; INS 33786.

Comments. Rather rare European species (Ježek 1984, 1994; Ježek and Omelková 2007; Kroča and Ježek 2022). Important species for nature conservation, assessed as critically endangered in the Czech Republic.

4. *Lepimormia hemiboreale* Salmela & Piirainen, 2005

Published record. Salmela and Piirainen (2005): 302.

Comments. Known only from its type locality in the Viidumäe Nature Reserve, Estonia.

***5. *Promormia eatoni* (Tonnoir, 1940)**

Material examined. Pärnumaa • ♂; Kalita NR; 58°04'15"N, 24°51'37"E; 25.07.–24.08.2017; TWT (on *Populus tremula*); IS leg.; INS 33796. **Lääne-Virumaa** • ♂; near Lasila, forest patch No 79; 59°16'37"N, 26°13'22"E; 31.05.–28.06.2016; MT; OK leg.; INS 33782.

Comments. Rather rare European species (Ježek 1984, 1994; Ježek and Omelková 2007; Kroča and Ježek 2022). Important species for nature conservation, assessed as endangered in the Czech Republic.

Paramormiini
Paramormiina

***6. *Lepiseodina rothschildi* (Eaton, 1912)**

Material examined. Saaremaa • ♂; Ruhnu Island; 57°48'22"N, 23°15'08"E; 09.06.–10.07.2012; TWT (on dead *Picea abies* (L.) H. Karst.); IS leg. **Pärnumaa** • ♂; Kihnu Island; 58°06'59"N, 23°59'38"E; 22.05.–11.06.2012; TWT (on old *Quercus robur*); IS leg.; • ♂; Kihnu Island; 58°09'09"N, 24°00'32"E; 22.05.–11.06.2012; TWT (on *Quercus robur*); IS leg.

Comments. Rather rare European species (Oboňa et al. 2021; Jaume-Schinkel et al. 2022). Important species for nature conservation, assessed as nationally scarce in the Czech Republic.

7. *Panimerus albifacies* (Tonnoir, 1919)

Published record. Salmela and Piirainen (2005): 304.

Material examined. Saaremaa • ♂; Ruhnu Island; 57°48'20"N, 23°14'33"E; 07.06.–10.07.2012; TWT (on dead *Alnus glutinosa* (L.) Gaertn.); IS leg.

Comments. European species (Ježek et al. 2021b; Jaume-Schinkel et al. 2023).

***8. *Panimerus notabilis* (Eaton, 1893)**

Material examined. Saaremaa • ♂; Ruhnu Island; 57°48'20"N, 23°14'33"E; 07.08.–05.09.2012; TWT (on dead *Alnus glutinosa*); IS leg. **Pärnumaa** • ♂; Kihnu Island; 58°06'59"N, 23°59'38"E; 12.07.–09.08.2012; TWT (on old *Quercus robur*); IS leg. **Tartumaa** • ♂; Vorbuse, Lokaatorite tee; 58°25'27"N, 26°35'47"E; 25.06.–14.07.2023; MT; OK leg.

Comments. Common European species (Ježek et al. 2019; Jaume-Schinkel et al. 2023).

9. *Parajungiella consors* (Eaton, 1893)

Published record. Salmela and Piirainen (2005): 304.

Comments. Not common European species (Kroča and Ježek 2022).

***10. *Parajungiella longicornis* (Tonnoir, 1919)**

Material examined. Pärnumaa • ♂; Riimaru; 58°16'18"N, 25°11'02"E; 17.08.–31.08.2005; TWT (on *Populus tremula*); IS leg. **Lääne-Virumaa** • ♂; Tudusoo NR; 59°04'47"N, 26°45'38"E; 28.05.–25.06.2017; TWT (on *Populus tremula*); IS leg.; INS 33794.

Comments. European and West-Siberian species (Ježek et al. 2020).

11. *Parajungiella pseudolongicornis* (Wagner, 1975)

Published record. Salmela and Piirainen (2005): 304.

Material examined. Lääne-Virumaa • ♂; Suigu NR; 59°09'11"N, 26°49'10"E; 26.07.–29.08.2017; TWT (on dead *Populus tremula*); IS leg.; INS 33779.

Comments. Rare European species (Ježek and Omelková 2012; Kroča and Ježek 2022). Important species for nature conservation, assessed as critically endangered in the Czech Republic.

*12. *Parajungiella serbica* (Krek, 1985)

Material examined. Pärnumaa • ♂; Riimaru; 58°16'19"N, 25°10'47"E; 02.06.–01.07.2006; TWT (on *Populus tremula* with *Phellinus tremulae* (Bondartsev) Bondartsev & N.P. Borisov); IS leg.

Comments. Rather rare European and Transcaucasian species (Ježek et al. 2020). Important species for nature conservation, assessed as critically endangered in the Czech Republic.

13. *Paramormia* (*Paramormia*) *polyascoidea* (Krek, 1971)

Published record. Salmela and Piirainen (2005): 304.

Comments. European, West-Siberian and Transcaucasian species (Ježek et al. 2020, 2023b).

14. *Peripsychoda auriculata* (Curtis, 1839)

Published record. Salmela and Piirainen (2005): 304.

Material examined. Saaremaa • ♂♂; Ruhnu Island; 57°48'15"N, 23°14'32"E; 07.06.–10.07.2012, 10.07.–07.08.2012; TWT (on *Acer platanoides*); IS leg.

Comments. European and Transcaucasian species (Ježek et al. 2020, 2023b; Morelli and Biscaccianti 2021).

15. *Seoda carthusiana* (Vaillant, 1972)

Published record. Salmela and Piirainen (2005): 304.

Comments. European species (Kroča and Ježek 2022).

*16. *Seoda gressica* (Vaillant, 1972)

Material examined. Saaremaa • ♂; Ruhnu Island; 57°47'59"N, 23°14'34"E; 26.05.–28.06.2011; TWT (on dead *Fraxinus excelsior* L.); IS leg.; INS 33783. **Pärnumaa** • ♂♂; Kihnu Island; 58°07'49"N, 24°00'15"E; 22.05.–11.06.2012, 11.06.–12.07.2012; TWT (on old *Quercus robur*); IS leg.

Comments. Sporadically common European species (Ježek and Omelková 2012; Kroča and Ježek 2022).

*17. *Seoda labeculosa* (Eaton, 1893)

Material examined. Lääne-Virumaa • ♂♂; near Lasila, forest patch No 24; 59°16'27"N, 26°11'44"E; 30.05.–02.07.2015, 02.08.–24.08.2015; MT; OK leg.; • ♂; near Lasila, forest patch No 31; 59°15'48"N, 26°14'17"E; 30.05.–02.07.2015; MT; OK leg.; • ♂; near Lasila, forest patch No 50; 59°16'25"N, 26°14'02"E; 02.08.–24.08.2015; OK leg.; • ♂; near Lasila, forest patch No 79; 59°16'37"N, 26°13'22"E; 28.06.–28.07.2016; MT; OK leg.; INS 33831.

Comments. Species known only from Europe (Ježek et al. 2019). Important for nature conservation, assessed as endangered in the Czech Republic.

Trichopsychodina

18. *Feuerborniella obscura* (Tonnoir, 1919)

Published record. Salmela and Piirainen (2005): 304.

Material examined. Pärnumaa • ♂♂; Riimaru; 58°16'19"N, 25°10'47"E; 11.06.–29.06.2005, 02.06.–01.07.2006; TWT (on *Populus tremula* with *Phellinus tremulae*); IS leg.; INS 33802, 33833.

Comments. European and Transcaucasian species (Oboňa et al. 2019; Ježek et al. 2020, 2021a, b, 2023b).

*19. *Philosepedon* (*Philosepedon*) *austriacum* Vaillant, 1974

Material examined. Lääne-Virumaa • ♂; near Lasila, forest patch No 50; 59°16'25"N, 26°14'02"E; 28.07.–29.08.2016; MT; OK leg.; INS 33824.

Comments. European species (Ježek et al. 2020; Kroča and Ježek 2022).

*20. *Philosepedon* (*Philosepedon*) *dumosum* Omelková & Ježek, 2012

Material examined. Pärnumaa • ♂; Luitemaa NR near Võiste; 58°12'21"N, 24°29'36"E; 23.06.–25.07.2017; TWT (on burned *Pinus sylvestris* L.); IS leg.; INS 33818.

Comments. Species known only from the Czech Republic (Omelková and Ježek 2012a). Important for nature conservation, assessed as nationally scarce in the Czech Republic.

21. *Philosepedon* (*Philosepedon*) *humerale* (Meigen, 1818)

Published records. Salmela and Piirainen (2005): 304.

Material examined. Hiiumaa • ♂; Leigri NR; 58°53'51"N, 22°35'46"E; 19.07.–03.08.2013; TWT (on *Pinus sylvestris*); IS leg. **Saaremaa** • ♂; Ruhnu Island, near church; 57°48'23"N, 23°14'41"E; 03.08.–11.09.2011; TWT (on old

Quercus robur); IS leg.; • ♂; Ruhnu Island; 57°47'55"N, 23°15'53"E; 24.05.–27.06.2011; TWT (on dead *Pinus sylvestris*); IS leg.; • ♂♂; Ruhnu Island; 57°47'59"N, 23°14'34"E; 26.05.–28.06.2011, 28.06.–03.08.2011, 07.08.–05.09.2012; TWT (on dead *Fraxinus excelsior*); IS leg.; • ♂♂; Ruhnu Island; 57°48'28"N, 23°14'32"E; 26.05.–28.06.2011, 28.06.–03.08.2011, 03.08.–11.09.2011; TWT (on dead *Fraxinus excelsior*); IS leg.; • ♂; Ruhnu Island; 57°48'01"N, 23°14'38"E; 07.08.–05.09.2012; TWT (on *Acer platanoides*); IS leg.; • ♂; Ruhnu Island; 57°48'08"N, 23°15'49"E; 06.08.–04.09.2012; TWT (on *Picea abies* with *Fomitopsis pinicola* (Sw.) P. Karst.); IS leg.; • ♂♂; Ruhnu Island; 57°48'09"N, 23°14'25"E; 07.06.–10.07.2012, 07.08.–05.09.2012; TWT (on *Fraxinus excelsior*); IS leg.; • ♂; Ruhnu Island; 57°48'09"N, 23°14'29"E; 07.08.–05.09.2012; TWT (on *Corylus avellana* L.); IS leg.; • ♂♂; Ruhnu Island; 57°48'10"N, 23°14'24"E; 07.06.–10.07.2012, 10.07.–07.08.2012, 07.08.–05.09.2012; TWT (on *Fraxinus excelsior*); IS leg.; • ♂♂; Ruhnu Island; 57°48'15"N, 23°14'32"E; 10.07.–07.08.2012, 07.08.–05.09.2012; TWT (on *Acer platanoides*); IS leg.; • ♂; Ruhnu Island; 57°48'18"N, 23°14'27"E; 07.08.–05.09.2012; TWT (on *Quercus robur*); IS leg.; • ♂; Ruhnu Island; 57°48'20"N, 23°14'33"E; 07.08.–05.09.2012; TWT (on *Alnus glutinosa*); IS leg.; • ♂; Ruhnu Island; 57°48'20"N, 23°15'30"E; 06.08.–04.09.2012; TWT (on dead *Picea abies* with *Fomitopsis pinicola*); IS leg.; • ♂; Ruhnu Island; 57°48'22"N, 23°15'08"E; 09.06.–10.07.2012; TWT (on dead *Picea abies*); IS leg.; • ♂♂; Ruhnu Island; 57°48'02"N, 23°13'42"E; 07.06.–10.07.2012, 07.08.–05.09.2012; TWT (on old *Ulmus laevis* Pallas); IS leg.; • ♂♂; Ruhnu Island; 57°48'27"N, 23°14'32"E; 09.06.–10.07.2012, 10.07.–07.08.2012, 07.08.–05.09.2012; TWT (on *Corylus avellana*); IS leg.; • ♂; Ruhnu Island; 57°47'54"N, 23°16'18"E; 06.08.–04.09.2012; TWT (on dead *Pinus sylvestris*); IS leg. **Läänemaa** • ♂♂; Vormsi Island; 59°01'18"N, 23°08'00"E; 08.05.–04.06.2012, 03.08.–11.09.2012; TWT (on *Corylus avellana*); IS leg.; • ♂♂; Vormsi Island; 58°59'30"N, 23°11'34"E; 04.06.–06.07.2011, 06.07.–19.07.2011, 06.07.–03.08.2012; TWT (on *Quercus robur*); IS leg.; • ♂♂; Vormsi Island; 58°59'26"N, 23°11'51"E; 08.05.–04.06.2012, 06.07.–03.08.2012; TWT (on *Salix fragilis* L.); IS leg.; • ♂; Vormsi Island; 58°58'11"N, 23°12'21"E; 08.05.–04.06.2012; TWT (on dead *Pinus sylvestris*); IS leg.; • ♂; Vormsi Island; 59°01'20"N, 23°08'13"E; 09.05.–04.06.2012; TWT (on dead *Alnus glutinosa*); IS leg.; • ♂; Vormsi Island; 59°00'16"N, 23°13'49"E; 10.05.–04.06.2012; TWT (on *Pinus sylvestris*); IS leg.; **Pärnumaa** • ♂; Kihnu Island; 58°06'59"N, 23°59'38"E; 02.07.–06.08.2011; TWT (on old *Quercus robur*); IS leg.; • ♂; Kihnu Island; 58°08'28"N, 23°58'47"E; 01.07.–06.08.2011; TWT (on old *Pinus sylvestris*); IS leg.; • ♂; Kihnu Island; 58°08'44"N, 23°58'14"E; 29.05.–01.07.2011; TWT (on old *Aesculus hippocastanum*); IS leg.; • ♂; Kihnu Island; 58°08'44"N, 23°58'16"E; 06.08–13.09.2011; TWT (on old *Tilia cordata* Mill.); IS leg.; • ♂; Kihnu Island; 58°08'48"N, 23°58'17"E; 01.07.–06.08.2011; TWT (on dead *Fraxinus excelsior*); IS leg.; • ♂; Kihnu Island, Lemsi; 58°07'49"N, 24°00'15"E; 06.08.–13.09.2011; TWT (on old *Quercus robur*); IS leg.; • ♂♂; Kihnu Island; 58°06'59"N, 23°59'38"E; 22.05.–11.06.2012, 12.07.–09.08.2012; TWT (on old *Quercus robur*); IS leg.; • ♂♂; Kihnu Island; 58°07'18"N, 23°58'25"E; 23.05.–11.06.2012, 11.06.–12.07.2012; TWT (on *Pinus sylvestris*); IS leg.; • ♂♂; Kihnu Island; 58°07'49"N, 24°00'15"E; 22.05.–11.06.2012, 12.07.–09.08.2012; TWT (on old *Quercus robur*); IS leg.; • ♂♂; Kihnu Island; 58°08'07"N, 23°58'20"E; 12.07.–09.08.2012, 09.08.–08.09.2012; TWT (on *Pinus sylvestris*); IS leg.; • ♂♂; Kihnu Island;

58°08'28"N, 23°58'47"E; 23.05.–11.06.2012, 11.06.–12.07.2012, 12.07.–09.08.2012; TWT (on *Pinus sylvestris*); IS leg.; • ♂♂; Kihnu Island; 58°08'44"N, 23°58'14"E; 23.05.–11.06.2012, 11.06.–12.07.2012; TWT (on old *Aesculus hippocastanum*); IS leg.; • ♂; Kihnu Island; 58°09'09"N, 24°00'32"E; 11.06.–12.07.2012; TWT (on *Quercus robur*); IS leg.; • ♂; Puhtu; 58°33'39.4"N, 23°33'07.9"E; 10.07.–13.08.2009; TWT (on dead *Picea abies* with *Fomitopsis pinicola*); IS leg.; • ♂; Puhtu; 58°33'25"N, 23°33'04"E; 27.05.–18.06.2009; TWT (on old *Pinus sylvestris*); IS leg.; • ♂; Kalita NR; 58°04'16"N, 24°51'39"E; 25.07.–24.08.2017; TWT (on *Populus tremula*); IS leg. **Lääne-Virumaa** • ♂; Lahemaa NP, Eru; 59°34'03"N, 25°51'53"E; 26.07.–26.08.2017; TWT (on burned *Picea abies*); IS leg.; • ♂♂; Lahemaa NP, near Laukasoo; 59°28'49"N, 25°54'24"E; 23.05.–23.06.2017, 25.07.–26.08.2017; TWT (on dead *Populus tremula*); IS leg.; • ♂♂; near Lasila, forest patch No 104; 59°16'43"N, 26°17'07"E; 12.–30.05.2015, 02.07.–02.08.2015, 20.09.–21.10.2015, 31.05.–28.06.2016; MT; OK leg.; • ♂♂; near Lasila, forest patch No 24; 59°16'27"N, 26°11'44"E; 12.–30.05.2015, 30.05.–02.07.2015, 02.07.–02.08.2015, 02.–24.08.2015, 24.08.–20.09.2015, 20.09.–21.10.2015, 31.05.–28.06.2016, 05.–31.05.2016; MT; OK leg.; • ♂♂; near Lasila, forest patch No 31; 59°15'48"N, 26°14'17"E; 12.–30.05.2015, 30.05.–02.07.2015, 02.07.–02.08.2015, 02.–24.08.2015, 24.08.–20.09.2015, 20.09.–21.10.2015, 28.06.–28.07.2016; MT; OK leg.; • ♂♂; near Lasila, forest patch No 50; 59°16'25"N, 26°14'02"E; 12.–30.05.2015, 02.–24.08.2015, 31.05.–28.06.2016, 28.06.–28.07.2016, 29.08.–26.09.2016; MT; OK leg.; • ♂♂; near Lasila, forest patch No 52; 59°16'20"N, 26°13'52"E; 31.05.–28.06.2016, 28.06.–28.07.2016, 28.07.–29.08.2016, 29.08.–26.09.2016; MT; OK leg.; • ♂♂; near Lasila, forest patch No 6; 59°15'41"N, 26°12'32"E; 12.–30.05.2015, 30.05.–02.07.2015, 02.07.–02.08.2015, 02.–24.08.2015, 24.08.–20.09.2015, 20.09.–21.10.2015, 31.05.–28.06.2016, 28.07.–29.08.2016, 29.08.–26.09.2016, 26.09.–27.10.2016; MT; OK leg.; • ♂♂; near Lasila, forest patch No 7; 59°15'33"N, 26°12'41"E; 12.–30.05.2015, 02.07.–02.08.2015, 02.–24.08.2015; MT; OK leg.; • ♂♂; near Lasila, forest patch No 75; 59°16'49"N, 26°13'05"E; 30.05.–02.07.2015, 02.07.–02.08.2015, 20.09.–21.10.2015, 05.–31.05.2016, 28.07.–29.08.2016; MT; OK leg.; • ♂♂; near Lasila, forest patch No 79; 59°16'37"N, 26°13'22"E; 12.–30.05.2015, 30.05.–02.07.2015, 02.07.–02.08.2015, 02.–24.08.2015, 20.09.–21.10.2015, 05.–31.05.2016, 31.05.–28.06.2016, 28.06.–28.07.2016, 28.07.–29.08.2016, 29.08.–26.09.2016; MT; OK leg. **Ida-Virumaa** • ♂; Muraka NR; 59°05'22"N, 27°09'18"E; 15.06.–30.06.2015; TWT (on dead *Picea abies*); IS leg. **Tartumaa** • ♂; Vorbuse, Lokaatorite tee; 58°25'27"N, 26°35'47"E; 10.–25.06.2023; MT; OK leg.; • ♂; Elva-Vitipalu PL; 58°10'49"N, 26°25'14"E; 13.06.–29.06.2015; TWT (on dead *Picea abies*); IS leg. **Valgamaa** • ♂♂; Soontaga; 58°00'04"N, 26°05'11"E; 07.05.–05.06.2015, 05.06.–06.07.2015, 03.–31.08.2015; TWT (on dead *Betula pendula* with *Fomes fomentarius* (L.) Fr.); IS leg.; • ♂♂; Soontaga; 58°00'04"N, 26°05'15"E; 07.05.–05.06.2015, 05.06.–06.07.2015, 06.07.–03.08.2015; TWT (on dead *Betula pendula*); IS leg.; • ♂♂; Soontaga; 58°00'01"N, 26°05'10"E; 19.05.–05.06.2015, 05.06.–06.07.2015, 06.07.–03.08.2015, 03.–31.08.2015; TWT (on dead *Populus tremula*); IS leg.; • ♂♂; Soontaga; 58°00'03"N, 26°05'31"E; 11.05.–05.06.2015, 05.06–06.07.2015, 06.07.–03.08.2015; TWT (on *Acer platanoides*); IS leg.; • ♂; Koiva wooded meadow; 57°41'21"N, 26°11'08"E; 14.05.–

03.06.2013; TWT (on dead *Quercus robur*); IS leg.; • ♂; Koiva wooded meadow; 57°41'19"N, 26°10'59"E; 01.08.–17.08.2013; TWT (on dead *Quercus robur*); IS leg.; • ♂; Koivakonnu; 57°35'28"N, 26°19'21"E; 01.08.–17.08.2013; TWT (on dead *Quercus robur*); IS leg. **Võrumaa** • ♂; Haanja NP; 57°44'07"N, 27°03'50"E; 18.05.–20.06.2017; TWT (on dead *Populus tremula*); IS leg.; • ♂; Haanja NP; 57°44'08"N, 27°03'46"E; 20.06.–23.07.2017; TWT (on dead *Betula pendula* with *Fomes fomentarius*); IS leg.; • ♂; Piusa PL; 57°47'28"N, 27°21'57"E; 18.05.–19.06.2017, 19.06.–23.07.2017; TWT (on burned *Pinus sylvestris*); IS leg.

Comments. Very common European species (Ježek et al. 2020).

*22. *Philosepedon* (*Philothreticus*) *soljani* Krek, 1971

Material examined. Lääne-Virumaa • ♂; near Lasila, forest patch No 50; 59°16'25"N, 26°14'02"E; 28.07.–29.08.2016; MT; OK leg.

Comments. European species (Ježek et al. 2017; Kroča and Ježek 2022). Important for nature conservation, assessed as nationally scarce in the Czech Republic.

*23. *Philosepedon* (*Trichosepedon*) *balkanicum* Krek, 1970

Material examined. Hiiumaa • ♂; Leigri NR; 58°53'00"N, 22°35'25"E; 05.06.–18.06.2013; TWT (on dead *Picea abies*); IS leg. **Saaremaa** • ♂; Ruhnu Island; 57°48'23"N, 23°14'41"E; 03.08.–11.09.2011; TWT (on *Quercus robur*); IS leg.; • ♂; Ruhnu Island; 57°47'54"N, 23°15'26"E; 06.08.–04.09.2012; TWT (on *Pinus sylvestris*); IS leg. **Läänemaa** • ♂; Vormsi Island; 59°01'01"N, 23°12'18"E; 03.08.–01.09.2012; TWT (on *Pinus sylvestris*); IS leg.; • ♂♂; Vormsi Island; 59°01'22"N, 23°12'12"E; 19.08.–04.09.2011, 03.08.–01.09.2012; TWT (dead *Picea abies* with *Fomitopis pinicola*); IS leg. **Pärnumaa** • ♂; Riimaru; 58°16'18"N, 25°11'02"E; 02.06.–01.07.2006; TWT (on *Populus tremula*); IS leg.; • ♂♂; Riimaru; 58°16'18"N, 25°11'02"E; 11.–29.06.2005, 17.–31.08.2005; TWT (on *Populus tremula*); IS leg.; INS 33806; • ♂; Kalita NR; 58°04'15"N, 24°51'37"E; 25.07.–24.08.2017; TWT (on *Populus tremula*); IS leg.; • ♂; Luitemaa NR near Võiste; 58°12'21"N, 24°29'34"E; 20.05.–23.06.2017; TWT (on burned *Pinus sylvestris*); IS leg.; • ♂; Kihnu Island; 58°07'49"N, 24°00'15"E; 12.07.–09.08.2012; TWT (on *Quercus robur*); IS leg. **Viljandimaa** • ♂; Muti PL; 58°08'25"N, 25°40'50"E; 21.06.–24.07.2017; TWT (on dead *Betula pendula*); IS leg. **Ida-Virumaa** • ♂; Muraka NR S of Virunurme; 59°09'52"N, 27°00'48"E; 26.05.–25.06.2017; TWT (on dead *Populus tremula*); IS leg.; • ♂; Muraka NR; 59°05'22"N, 27°09'18"E; 30.05.–15.06.2015; TWT (on dead *Picea abies*); IS leg.; • ♂; Agusalu NR; 59°02'16"N, 27°39'35"E; 30.05.–15.06.2015; TWT (on dead *Pinus sylvestris*); IS leg. **Tartumaa** • ♂; Padakõrve NR; 58°35'07"N, 27°01'09"E; 30.05.–15.06.2015; TWT (on dead *Pinus sylvestris*); IS leg.; • ♂; Järvselja NR; 58°16'52"N, 27°19'27"E; 17.05.–19.06.2017; TWT (on dead *Populus tremula*); IS leg. **Põlvamaa** • ♂; Ihamaru NR; 58°05'52"N, 26°55'33"E; 29.05.–13.06.2015; TWT (on dead *Picea abies*); IS leg.

Comments. European and Transcaucasian species (Kvifte 2019; Ježek et al. 2023b).

*24. *Trichopsychoda hirtella* (Tonnoir, 1919)

Material examined. Saaremaa • ♂♂; Ruhnu Island, near Korsi farm; 57°48'28"N, 23°14'32"E; 26.05.–28.06.2011, 28.06.–03.08.2011; TWT (on dead *Fraxinus excelsior*); IS leg.; INS 33832; • ♂; Ruhnu Island; 57°48'08"N, 23°15'49"E; 06.08.–04.09.2012; TWT (on dead *Picea abies* with *Fomitopsis pinicola*); IS leg.; • ♂; Ruhnu Island; 57°48'09"N, 23°14'25"E; 07.08.–05.09.2012; TWT (on *Fraxinus excelsior*); IS leg.; • ♂; Ruhnu Island; 57°48'10"N, 23°14'24"E; 07.08.–05.09.2012; TWT (on *Fraxinus excelsior*); IS leg.; • ♂; Ruhnu Island; 57°48'15"N, 23°14'32"E;10.07.–07.08.2012; TWT (on *Acer platanoides*); IS leg.; • ♂; Ruhnu Island; 57°48'18"N, 23°14'27"E; 07.08.–05.09.2012; TWT (on *Quercus robur*); IS leg.; • ♂; Ruhnu Island, near Korsi farm; 57°48'27"N, 23°14'32"E; 09.06.–10.07.2012; TWT (on *Corylus avellana*); IS leg.; • ♂; Pihtla; 21.07.2016; hand picked; M. Oras leg. **Läänemaa** • ♂; Kullamaa; 23.07.2016; sweep net; K. Sammet leg. **Pärnumaa** • ♂♂; Riimaru; 58°16'19"N, 25°10'47"E; 29.06.–13.07.2005, 02.06.–01.07.2006; TWT (on *Populus tremula* with *Phellinus tremulae*); IS leg.; INS 33788. **Lääne-Virumaa** • ♂; near Lasila, forest patch No 31; 59°15'48"N, 26°14'17"E; 02.07.–02.08.2015; MT; OK leg.; • ♂; near Lasila, forest patch No 6; 59°15'41"N, 26°12'32"E; 28.07.–29.08.2016; MT; OK leg. **Tartumaa** • ♂; Vapramäe; 15.07.2016; sweep net; OK leg. **Valgamaa** • ♂; Soontaga; 58°00'03"N, 26°05'31"E; 05.06.–06.07.2015; TWT (on *Acer platanoides*); IS leg.; • ♂; Soontaga; 58°00'04"N, 26°05'11"E; 05.06.–06.07.2015; TWT (on dead *Betula pendula* with *Fomes fomentarius*); IS leg.; • ♂; Koivakonnu; 57°35'28"N, 26°19'21"E; 16.06.–02.07.2013; TWT (on dead *Quercus robur*); IS leg.

Comments. European and Transcaucasian species (Ježek et al. 2020, 2023b; Morelli and Biscaccianti 2021).

Psychodini

*25. *Chodopsycha buxtoni* (Withers, 1988)

Material examined. Lääne-Virumaa • ♂; near Lasila, forest patch No 50; 59°16'25"N, 26°14'02"E; 28.07.–29.08.2016; MT; OK leg.; INS 33825. **Valgamaa** • ♂; Koivakonnu; 57°35'28"N, 26°19'21"E; 17.08.–01.09.2013; TWT (on dead *Quercus robur*); IS leg.; INS 33834.

Comments. Not common European and Transcaucasian species (Ježek et al. 2023b). Important for nature conservation, assessed as nationally scarce in the Czech Republic.

*26. *Chodopsycha lobata* (Tonnoir, 1940)

Material examined. Lääne-Virumaa • ♀; near Lasila, forest patch No 50; 59°16'25"N, 26°14'02"E; 28.07.–29.08.2016; MT; OK leg.; INS 33823; • ♂; Tudusoo NR; 59°05'01"N, 26°45'54"E; 27.07.–29.08.2017; TWT (on dead *Populus tremula*); IS leg.; INS 33828.

Comments. Common European and Transcaucasian species (Ježek et al. 2020, 2021a, b).

27. *Logima albipennis* (Zetterstedt, 1850)

Published record. Salmela and Piirainen (2005): 304.

Material examined. Pärnumaa • ♂♂; Riimaru; 58°16'18"N, 25°11'02"E; 03.08.–17.08.2005, 31.07.–02.09.2006; TWT (on dead *Betula pendula* with *Fomes fomentarius*); IS leg.; • ♂; Kalita NR; 58°04'15"N, 24°51'37"E; 25.07.–24.08.2017; TWT (on *Populus tremula*); IS leg.; INS 33795.

Comments. Cosmopolitan species (Ježek et al. 2021a, 2023a).

*28. *Logima satchelli* (Quate, 1955)

Material examined. Saaremaa • ♂; Ruhnu Island; 57°47'55"N, 23°15'53"E; 24.05.–27.06.2011; TWT (on dead *Pinus sylvestris*); IS leg.; • ♂; Ruhnu Island, near Korsi farm; 57°48'28"N, 23°14'32"E; 26.05.–28.06.2011; TWT (on dead *Fraxinus excelsior*); IS leg.; • ♂; Ruhnu Island; 57°48'09"N, 23°14'25"E; 10.07.–07.08.2012; TWT (on *Fraxinus excelsior*); IS leg.; • ♂; Ruhnu Island; 57°48'09"N, 23°14'29"E; 07.06.–10.07.2012; TWT (on *Corylus avellana*); IS leg.; • ♂; Ruhnu Island; 57°48'18"N, 23°14'27"E; 07.08.–05.09.2012; TWT (on *Quercus robur*); IS leg.; • ♂♂; Ruhnu Island, Holma; 57°48'02"N, 23°13'42"E; 29.06.–02.08.2011, 07.06.–10.07.2012; TWT (on old *Ulmus laevis*); IS leg.; • ♂♂; Ruhnu Island, Korsi farm; 57°48'27"N, 23°14'32"E; 09.06.–10.07.2012, 10.07.–07.08.2012; TWT (on *Corylus avellana*); IS leg. **Läänemaa** • ♂; Puise; 58°47'45"N, 23°31'22"E; 17.06.–11.07.2009; TWT (on old *Betula pendula*); IS leg.; • ♂; Vormsi Island; 58°58'33"N, 23°12'10"E; 03.08.–01.09.2012; TWT (on dead *Betula pendula* with *Fomes fomentarius*); IS leg.; • ♂; Vormsi Island; 59°01'22"N, 23°12'12"E; 03.08.–01.09.2012; TWT (on dead *Picea abies* with *Fomitopis pinicola*); IS leg.; • ♂; Vormsi Island; 58°59'26"N, 23°11'51"E; 08.05.–04.06.2012; TWT (on *Salix fragilis*); IS leg. **Pärnumaa** • ♂; Kihnu Island; 58°08'07"N, 23°58'20"E; 24.05.–11.06.2012; TWT (on *Pinus sylvestris* with *Phellinus pini*); IS leg.; • ♂; Matsalu NP; 58°43'52"N, 23°42'54"E; 17.06.–11.07.2009; TWT (on dead *Betula pendula* with *Fomes fomentarius*); IS leg.; • ♂; Riimaru; 58°16'18"N, 25°11'02"E; 19.06.–03.08.2007; TWT (on *Populus tremula*); IS leg.; • ♂; Riimaru; 58°16'19"N, 25°10'47"E; 17.–31.08.2005; TWT (on *Populus tremula* with *Phellinus tremulae*); IS leg.; • ♂; Riimaru; 58°16'18"N, 25°11'02"E; 31.07.–02.09.2006; TWT (on dead *Betula pendula* with *Fomes fomentarius*); IS leg.; • ♂; Luitemaa NR near Võiste; 58°12'21"N, 24°29'36"E; 23.06.–25.07.2017; TWT (on burned *Pinus sylvestris*); IS leg. **Viljandimaa** • ♂; Muti PL; 58°08'25"N, 25°40'50"E; 19.05.–21.06.2017; TWT (on dead *Betula pendula* with *Fomes fomentarius*); IS leg. **Harjumaa** • ♂♂; Mähuste near Koitjärve; 59°24'55"N, 25°36'45"E; 01.07.–16.07.2015, 16.–30.07.2015, 15.08.–03.09.2015; TWT (on dead *Betula pendula*); IS leg.; • ♂♂; Põhja-Kõrvemaa NR; 59°25'30"N, 25°39'11"E; 15.05.–01.06.2015, 01.–16.06.2015, 16.06.–01.07.2015; TWT (on dead *Pinus sylvestris*); IS leg. **Lääne-Virumaa** • ♂; near Lasila, forest patch No 6; 59°15'41"N, 26°12'32"E; 31.05.–28.06.2016; MT; OK leg.; • ♂; near Lasila, forest patch No 7; 59°15'33"N, 26°12'41"E; 26.09.–27.10.2016; MT; OK leg.; • ♂; Suigu NR; 59°08'59"N, 26°49'11"E; 25.06.–26.07.2017; TWT (on *Populus tremula*); IS leg.; • ♀; Suigu NR; 59°09'11"N, 26°49'10"E; 25.06.–26.07.2017; TWT (on dead *Populus tremula*); IS leg. **Ida-Virumaa** • ♂; Kautvere near

Oonurme; 59°08'23"N, 26°57'10"E; 26.07.–28.08.2017; TWT (on dead *Populus tremula*); IS leg.; • ♂♂; Kurtna PL; 59°18'09"N, 27°34'08"E; 30.05.–15.06.2015, 15.–29.07.2015; TWT (on dead *Pinus sylvestris*); IS leg.; • ♂; Kurtna PL; 59°18'22"N, 27°33'53"E; 29.07.–14.08.2015; TWT (on dead *Pinus sylvestris*); IS leg.; • ♂; Agusalu NR; 59°04'16"N, 27°37'40"E; 14.–30.05.2015; TWT (on dead *Betula pendula* with *Fomes fomentarius*); IS leg.; • ♂; Agusalu NR; 59°02'17"N, 27°39'40"E; 29.07.–14.08.2015; TWT (on dead *Pinus sylvestris*); IS leg.; • ♂♂; Agusalu NR; 59°02'16"N, 27°39'35"E; 01.–14.05.2015, 30.05.–15.06.2015, 14.08.–01.09.2015; TWT (on dead *Pinus sylvestris*); IS leg.; • ♂; Agusalu NR; 59°03'56"N, 27°37'37"E; 30.04.–14.05.2015; TWT (on dead *Betula pendula*); IS leg.; • ♂; Agusalu NR; 59°04'16"N, 27°37'40"E; 30.04.–14.05.2015; TWT (on dead *Betula pendula* with *Fomes fomentarius*); IS leg.; • ♂♂; Agusalu NR; 59°07'10"N, 27°34'39"E; 30.04.–14.05.2015, 14.08.–01.09.2015; TWT (on dead *Betula pendula* with *Fomes fomentarius*); IS leg.; • ♂♂; Agusalu NR; 59°02'15"N, 27°39'42"E; 15.–30.06.2015, 14.08.–01.09.2015; TWT (on dead *Betula pendula*); IS leg. **Tartumaa** • ♂♂; Padakõrve NR; 58°35'07"N, 27°01'09"E; 30.04.–14.05.2015, 14.05.–30.05.2015, 30.05.–15.06.2015, 15.–30.06.2015, 14.08.–01.09.2015; TWT (on dead *Pinus sylvestris*); IS leg.; • ♂♂; Rootsiküla; 58°37'14"N, 27°10'47"E; 10.05.–06.06.2009, 02.–18.08.2009; TWT (on *Salix caprea* L.); IS leg.; • ♂; Vorbuse, Lokaatorite tee; 58°25'27"N, 26°35'47"E; 01.–15.10.2023; MT; OK leg.; • ♂; Välgi; 58°33'48"N, 26°52'38"E; 15.–29.07.2015; TWT (on *Populus tremula*); IS leg.; • ♂; Peipsiveere NR; 58°17'22"N, 27°08'59"E; 19.06.–22.07.2017; TWT (on dead *Populus tremula*); IS leg.; • ♂; Elva-Vitipalu PL; 58°10'49"N, 26°25'14"E; 27.04.–13.05.2015; TWT (on dead *Picea abies*); IS leg. **Põlvamaa** • ♂; Ihamaru NR; 58°06'09"N, 26°55'59"E; 27.04.–13.05.2015; TWT (on dead *Betula pendula* with *Fomes fomentarius*); IS leg. **Valgamaa** • ♂♂; Soontaga; 58°00'03"N, 26°05'31"E; 05.06.–06.07.2015, 06.07.–03.08.2015; TWT (on *Acer platanoides*); IS leg.; • ♂; Soontaga; 58°00'04"N, 26°05'11"E; 05.06.–06.07.2015; TWT (on dead *Betula pendula* with *Fomes fomentarius*); IS leg.; • ♂; Soontaga; 58°00'01"N, 26°05'10"E; 05.06.–06.07.2015; TWT (on *Populus tremula*); IS leg.; • ♂♂; Soontaga; 58°00'04"N, 26°05'15"E; 05.06.–06.07.2015, 06.07.–03.08.2015; TWT (on dead *Betula pendula*); IS leg.; • ♂; Tündre NR; 57°56'59"N, 25°37'51"E; 21.06.–24.07.2017; TWT (on burned *Picea abies*); IS leg.; • ♂; Koiva wooded meadow; 57°41'21"N, 26°10'54"E; 17.08.–01.09.2013; TWT (on dead *Salix caprea*); IS leg.; • ♂; Koiva wooded meadow; 57°41'19"N, 26°10'59"E; 17.07.–01.08.2013; TWT (on dead *Quercus robur*); IS leg.; • ♂; Koivakonnu; 57°35'27"N, 26°19'40"E; 16.06.–02.07.2013; TWT (on dead *Betula pendula* with *Fomes fomentarius*); IS leg.; • ♂♂; Koivakonnu; 57°35'28"N, 26°19'21"E; 16.06.–02.07.2013, 01.–17.08.2013; TWT (on dead *Quercus robur*); IS leg.

Comments. Holarctic species (Ježek et al. 2020, 2023a, b).

*29. *Logima sigma* (Kincaid, 1899)

Material examined. Tartumaa • ♀; Rootsiküla; 58°37'14"N, 27°10'47"E; 24.06.–15.07.2009; TWT (on dead *Salix caprea*); IS leg.; INS 33804.

Comments. Probably cosmopolitan species (Oboňa and Kozánek 2018; Ježek et al. 2021a).

30. *Psychoda phalaenoides* (Linnaeus, 1758)

Published records. Remm (1956): 234; Salmela and Piirainen (2005): 304.

Material examined. Saaremaa • ♂; Ruhnu Island, Holma; 57°48'02"N, 23°13'42"E; 07.08.–05.09.2012; TWT (on old *Ulmus laevis*); IS leg.; • ♂; Ruhnu Island, Korsi farm; 57°48'27"N, 23°14'32"E; 07.08.–05.09.2012; TWT (on *Corylus avellana*); IS leg.; • ♂; Ruhnu Island, Limo seashore; 57°47'37"N, 23°16'17"E; 06.08.–04.09.2012; TWT (on *Pinus sylvestris*); IS leg. **Läänemaa** • ♂; Vormsi Island; 59°01'18"N, 23°08'00"E; 08.05.–04.06.2012; TWT (on *Corylus avellana*); IS leg. **Pärnumaa** • ♂; Matsalu NP; 58°42'41"N, 23°41'19"E; 11.07.–14.08.2009; TWT (on *Populus tremula*); IS leg.; • ♂; Matsalu NP; 58°42'52"N, 23°41'23"E; 17.06.–11.07.2009; TWT (on dead *Populus tremula*); IS leg.; • ♂♂; Riimaru; 58°16'18"N, 25°11'02"E; 02.06.–01.07.2006, 19.06.–03.08.2007; TWT (on dead *Populus tremula*); IS leg.; • ♂; Riimaru; 58°16'19"N, 25°10'47"E; 02.06.–01.07.2006; TWT (on *Populus tremula* with *Phellinus tremulae*); IS leg.; • ♂; Kalita NR; 58°04'16"N, 24°51'39"E; 22.06.–25.07.2017; TWT (on *Populus tremula*); IS leg. **Viljandimaa** • ♂♂; Muti PL; 58°08'25"N, 25°40'50"E; 21.06.–24.07.2017, 24.07.–24.08.2017; TWT (on dead *Betula pendula* with *Fomes fomentarius*); IS leg. **Harjumaa** • ♂; Mähuste near Koitjärve; 59°24'55"N, 25°36'45"E; 16.07.–30.07.2015; TWT (on dead *Betula pendula*); IS leg. **Lääne-Virumaa** • ♂; Sakusaare; 59°28'58"N, 26°01'54"E; 25.07.–26.08.2017; TWT (dead *Pinus sylvestris*); IS leg.; • ♂; near Lasila, forest patch No 104; 59°16'43"N, 26°17'07"E; 02.07.–02.08.2015; MT; OK leg.; • ♂; near Lasila, forest patch No 31; 59°15'48"N, 26°14'17"E; 28.07.–29.08.2016; MT; OK leg.; • ♂♂; near Lasila, forest patch No 50; 59°16'25"N, 26°14'02"E; 28.06.–28.07.2016, 29.08.–26.09.2016, 26.09.–27.10.2016; MT; OK leg.; • ♂♂; near Lasila, forest patch No 6; 59°15'41"N, 26°12'32"E; 28.07.–29.08.2016, 26.09.–27.10.2016; MT; OK leg.; • ♂; near Lasila, forest patch No 7; 59°15'33"N, 26°12'41"E; 02.–24.08.2015; MT; OK leg.; • ♂♂; near Lasila, forest patch No 75; 59°16'49"N, 26°13'05"E; 02.07.–02.08.2015, 02.–24.08.2015, 20.09.–21.10.2015, 28.07.–29.08.2016; MT; OK leg.; • ♂♂; near Lasila, forest patch No 79; 59°16'37"N, 26°13'22"E; 02.–24.08.2015, 24.08.–20.09.2015, 05.–31.05.2016; MT; OK leg.; • ♀; Tudusoo NR; 59°04'52"N, 26°46'16"E; 26.07.–29.08.2017; TWT (on dead *Populus tremula*); IS leg. **Ida-Virumaa** • ♂; Kautvere near Oonurme; 59°08'23"N, 26°57'10"E; 26.05.–25.06.2017; TWT (on dead *Populus tremula*); IS leg.; • ♂; Muraka NR, S of Virunurm; 59°09'52"N, 27°00'48"E; 26.07.–28.08.2017; TWT (on dead *Populus tremula*); IS leg.; • ♂; Muraka NR; 59°05'22"N, 27°09'18"E; 30.04.–14.05.2015; TWT (on dead *Picea abies*); IS leg.; • ♂; Kurtna PL; 59°18'09"N, 27°34'08"E; 15.–29.07.2015; TWT (on dead *Pinus sylvestris*); IS leg.; • ♂; Kurtna PL; 59°18'22"N, 27°33'53"E; 15.–30.06.2015, 29.07.–14.08.2015; TWT (on dead *Pinus sylvestris*); IS leg.; • ♂♂; Agusalu NR; 59°02'16"N, 27°39'35"E; 01.–14.05.2015, 14.08.–01.09.2015; TWT (on dead *Pinus sylvestris*); IS leg.; • ♂; Agusalu NR; 59°02'17"N, 27°39'40"E; 15.–29.07.2015; TWT (on dead *Pinus sylvestris*); IS leg.; • ♂; Agusalu NR; 59°04'16"N, 27°37'40"E; 15.–30.06.2015; TWT (on dead *Betula pendula* with *Fomes fomentarius*); IS leg.; • ♂; Agusalu NR; 59°07'10"N, 27°34'39"E; 29.07.–14.08.2015; TWT (on dead *Betula pendula* with *Fomes fomentarius*); IS leg. **Tartumaa** • ♂; Välgi NR; 58°33'48"N, 26°52'38"E; 30.04.–14.05.2015; TWT (on *Populus tremula*); IS leg.; • ♂; Padakõrve NR; 58°35'07"N, 27°01'09"E; 30.04.–14.05.2015; TWT (on dead *Pinus sylvestris*); IS leg.; • ♂; Rootsiküla; 58°37'14"N, 27°10'47"E;

06.–24.06.2009; TWT (on dead *Salix caprea*); IS leg.; • ♂♂; Vorbuse, Lokaatorite tee; 58°25'27"N, 26°35'47"E; 30.04.–14.05.2023, 14.07.–02.08.2023, 02.08.–16.08.2023, 16.08.–30.08.2023, 30.08.–16.09.2023, 18.09.–01.10.2023, 01.10.–15.10.2023; MT; OK leg. **Valgamaa** • ♂; Soontaga; 58°00'03"N, 26°05'31"E; 05.06.–06.07.2015; TWT (on *Acer platanoides*); IS leg.; • ♂♂; Soontaga NR; 58°00'23"N, 26°03'19"E; 27.04.–13.05.2015, 29.05.–13.06.2015, 14.–28.07.2015; TWT (on dead *Picea abies*); IS leg.; • ♂; Koiva wooded meadow; 57°41'21"N, 26°11'08"E; 01.–17.08.2013; TWT (on dead *Quercus robur*); IS leg.; • ♂♂; Koivakonnu; 57°35'27"N, 26°19'40"E; 14.05.–03.06.2013, 03.–16.06.2013, 16.06.–02.07.2013, 02.–17.07.2013; TWT (on dead *Betula pendula* with *Fomes fomentarius*); IS leg.; • ♂♂; Koivakonnu; 57°35'28"N, 26°19'21"E; 14.05.–03.06.2013, 16.06.–02.07.2013, 17.08.–01.09.2013; TWT (on dead *Quercus robur*); IS leg. **Võrumaa** • ♂; Piusa PL; 57°47'28"N, 27°21'57"E; 18.05.–19.06.2017; TWT (on burned *Pinus sylvestris*); IS leg.; • ♂; Piusa PL; 57°47'33"N, 27°21'57"E; 19.06.–23.07.2017; TWT (on burned *Pinus sylvestris*); IS leg.

Comments. Holarctic species (Wagner 2018; Ježek et al. 2020, 2021a, b).

*31. *Psychodocha cinerea* (Banks, 1894)

Fig. 3A

Material examined. Saaremaa • ♂; Ruhnu Island; 57°47'46"N, 23°16'17"E; 06.08.–04.09.2012; TWT (on *Pinus sylvestris*); IS leg.; • ♂; Ruhnu Island; 57°47'54"N, 23°15'26"E; 06.08.–04.09.2012; TWT (on *Pinus sylvestris*); IS leg.; • ♂; Ruhnu Island; 57°48'01"N, 23°14'38"E; 07.08.–05.09.2012; TWT (on *Acer platanoides*); IS leg.; • ♂; Ruhnu Island; 57°48'06"N, 23°13'58"E; 07.08.–05.09.2012; TWT (on *Sorbus intermedia* with *Laetiporus sulphureus* (Bull.) Murrill); IS leg.; • ♂; Ruhnu Island; 57°48'09"N, 23°14'29"E; 07.08.–05.09.2012; TWT (on *Corylus avellana*); IS leg.; • ♂; Ruhnu Island; 57°48'10"N, 23°14'24"E; 10.07.–07.08.2012; TWT (on *Fraxinus excelsior*); IS leg.; • ♂; Ruhnu Island; 57°48'15"N, 23°14'32"E; 07.08.–05.09.2012; TWT (on *Acer platanoides*); IS leg.; • ♂; Ruhnu Island; 57°48'16"N, 23°16'06"E; 06.08.–04.09.2012; TWT (on dead *Pinus sylvestris*); IS leg.; • ♂; Ruhnu Island; 57°48'20"N, 23°14'33"E; 07.08.–05.09.2012; TWT (on dead *Alnus glutinosa*); IS leg.; • ♂; Ruhnu Island; 57°48'24"N, 23°15'16"E; 07.08.–05.09.2012; TWT (on dead *Salix caprea*); IS leg.; • ♂♂; Ruhnu Island, Korsi farm; 57°48'27"N, 23°14'32"E; 10.07.–07.08.2012; 07.08.–05.09.2012; TWT (on *Corylus avellana*); IS leg.; • ♂; Ruhnu Island, Limo seashore; 57°47'54"N, 23°16'18"E; 06.08.–04.09.2012; TWT (on dead *Pinus sylvestris*); IS leg.; • ♂; Ruhnu Island; 57°48'08"N, 23°15'49"E; 06.08.–04.09.2012; TWT (on dead *Picea abies* with *Fomitopsis pinicola*); IS leg. **Läänemaa** • ♂; Vormsi Island; 59°00'17"N, 23°10'58"E; 03.08.–01.09.2012; TWT (on dead *Picea abies*); IS leg.; • ♂♂; Vormsi Island; 59°01'20"N, 23°08'13"E; 09.05.–04.06.2012, 03.08.–01.09.2012; TWT (on dead *Alnus glutinosa*); IS leg.; • ♂; Vormsi Island; 58°59'26"N, 23°11'51"E; 08.05.–04.06.2012; TWT (on dead *Salix fragilis*); IS leg.; • ♂♂; Vormsi Island; 59°01'01"N, 23°12'18"E; 06.07.–03.08.2012, 03.08.–01.09.2012; TWT (on *Pinus sylvestris*); IS leg. **Pärnumaa** • ♂; Matsalu NP; 58°42'41"N, 23°41'19"E; 29.05.–17.06.2009; TWT (on *Populus tremula*); IS leg.; • ♂♂; Kihnu Island; 58°08'07"N, 23°58'20"E; 06.08.–13.09.2011, 09.08.–08.09.2012; TWT (on *Pinus sylvestris* with *Phellinus pini*); IS leg.; • ♂; Kihnu Island; 58°08'16"N, 23°58'24"E; 06.08.–13.09.2011; TWT (on dead *Pinus sylvestris*); IS leg.; • ♂; Kihnu Island; 58°08'28"N,

23°58'47"E; 11.06.–12.07.2012; TWT (on *Pinus sylvestris*); IS leg.; • ♂; Luitemaa NR near Võiste; 58°12'21"N, 24°29'36"E; 23.06.–25.07.2017; TWT (on burned *Pinus sylvestris*); IS leg.; • ♂; Laulaste NR; 57°59'41"N, 24°32'16"E; 17.06.–03.07.2013; TWT (on dead *Picea abies* with *Fomitopsis pinicola*); IS leg.; • ♂♂; Laulaste NR; 57°59'23"N, 24°33'15"E; 17.06.–03.07.2013, 03.–18.07.2013, 02.–18.08.2013; TWT (on dead *Pinus sylvestris*); IS leg.; • ♂♂; Laulaste NR; 57°59'35"N, 24°33'35"E; 04.–17.06.2013, 03.–18.07.2013, 02.–18.08.2013; TWT (on *Betula pendula*); IS leg.; • ♂; Kalita NR, 58°04'15"N, 24°51'37"E; 25.07.–24.08.2017; TWT (on *Populus tremula*); IS leg. **Harjumaa** • ♂; Põhja-Kõrvemaa NR; 59°25'30"N, 25°39'11"E; 16.06.–01.07.2015; TWT (on dead *Pinus sylvestris*); IS leg. **Lääne–Virumaa** • ♂♂; near Lasila, forest patch No 104; 59°16'43"N, 26°17'07"E; 30.05.–02.07.2015, 12.–30.05.2015, 02.07.–02.08.2015; MT; OK leg.; • ♂♂; near Lasila, forest patch No 24; 59°16'27"N, 26°11'44"E; 30.05.–02.07.2015, 02.–24.08.2015; MT; OK leg.; • ♂♂; near Lasila, forest patch No 31; 59°15'48"N, 26°14'17"E; 12.–30.05.2015, 02.07.–02.08.2015, 02.–24.08.2015, 24.08.–20.09.2015; MT; OK leg.; • ♂♂; near Lasila, forest patch No 50; 59°16'25"N, 26°14'02"E; 02.08.–24.08.2015, 24.08.–20.09.2015; MT; OK leg.; • ♂; near Lasila, forest patch No 52; 59°16'20"N, 26°13'52"E; 26.09.–27.10.2016; MT; OK leg.; • ♂♂; near Lasila, forest patch No 6; 59°15'41"N, 26°12'32"E; 12.–30.05.2015, 29.08.–26.09.2016; MT; OK leg.; • ♂; near Lasila, forest patch No 7; 59°15'33"N, 26°12'41"E; 02.07.–02.08.2015; MT; OK leg.; • ♂; near Lasila, forest patch No 75; 59°16'49"N, 26°13'05"E; 12.–30.05.2015; MT; OK leg.; • ♂; near Lasila, forest patch No 79; 59°16'37"N, 26°13'22"E; 02.07.–02.08.2015; MT; OK leg. **Ida-Virumaa** • ♂; Muraka NR; 59°10'50"N, 27°09'44"E; 27.07.–29.08.2017; TWT (on dead *Populus tremula*); IS leg.; • ♂; Kurtna PL; 59°18'22"N, 27°33'53"E; 29.07.–14.08.2015; TWT (on dead *Pinus sylvestris*); IS leg.; • ♂; Agusalu NR; 59°02'16"N, 27°39'35"E; 14.08.–01.09.2015; TWT (on dead *Pinus sylvestris*); IS leg.; • ♂♂; Agusalu NR; 59°02'17"N, 27°39'40"E; 15.–29.07.2015, 29.07.–14.08.2015; TWT (on dead *Pinus sylvestris*); IS leg.; • ♂; Agusalu NR; 59°02'15"N, 27°39'42"E; 15.–30.06.2015; TWT (on dead *Betula pendula*); IS leg. **Jõgevamaa** • ♂♂; Kääpa NR; 58°38'58"N, 26°51'12"E; 15.–30.06.2013, 31.07.–15.08.2013; TWT (on dead *Pinus sylvestris*); IS leg. **Tartumaa** • ♂♂; Välgi NR; 58°33'48"N, 26°52'38"E; 14.05.–30.05.2015, 29.07.–14.08.2015; TWT (on *Populus tremula*); IS leg.; • ♂; Padakõrve NR; 58°36'08"N, 26°58'09"E; 31.07.–15.08.2013; TWT (on *Picea abies*); IS leg.; • ♂; Padakõrve NR; 58°35'38"N, 26°57'52"E; 15.08.–04.09.2013; TWT (on dead *Pinus sylvestris*); IS leg.; • ♂♂; Padakõrve NR; 58°35'07"N, 27°01'09"E; 14.05–30.05.2015, 14.08–01.09.2015; TWT (on dead *Pinus sylvestris*); IS leg.; • ♂♂; Vorbuse, Lokaatorite tee; 58°25'27"N, 26°35'47"E; 14.05.–29.05.2023, 25.06.–14.07.2023, 02.08–16.08.2023, 16.08.–30.08.2023, 08.–16.09.2023, 18.09.–01.10.2023, 01.10.–15.10.2023, 15.10.–29.10.2023; MT; OK leg. **Põlvamaa** • ♂; Ihamaru NR; 58°06'09"N, 26°55'59"E; 27.04.–13.05.2015; TWT (on dead *Betula pendula* with *Fomes fomentarius*); IS leg. **Valgamaa** • ♂; Soontaga; 58°00'04"N, 26°05'11"E; 05.06.–06.07.2015; TWT (on dead *Betula pendula* with *Fomes fomentarius*); IS leg.; • ♂; Koiva wooded meadow; 57°41'26"N, 26°11'06"E; 17.08.–01.09.2013; TWT (on *Quercus robur*); IS leg.; • ♂; Koivakonnu; 57°35'27"N, 26°19'40"E; 14.05.–03.06.2013; TWT (on dead *Betula pendula* with *Fomes fomentarius*); IS leg.; • ♂♂; Koivakonnu; 57°35'28"N, 26°19'21"E; 16.06.–02.07.2013, 01.–17.08.2013; TWT (on dead *Quercus robur*); IS leg.

Comments. Cosmopolitan species (Ježek and Yağci 2005; Afzan and Belqat 2016; Ježek et al. 2020, 2021a, 2023b).

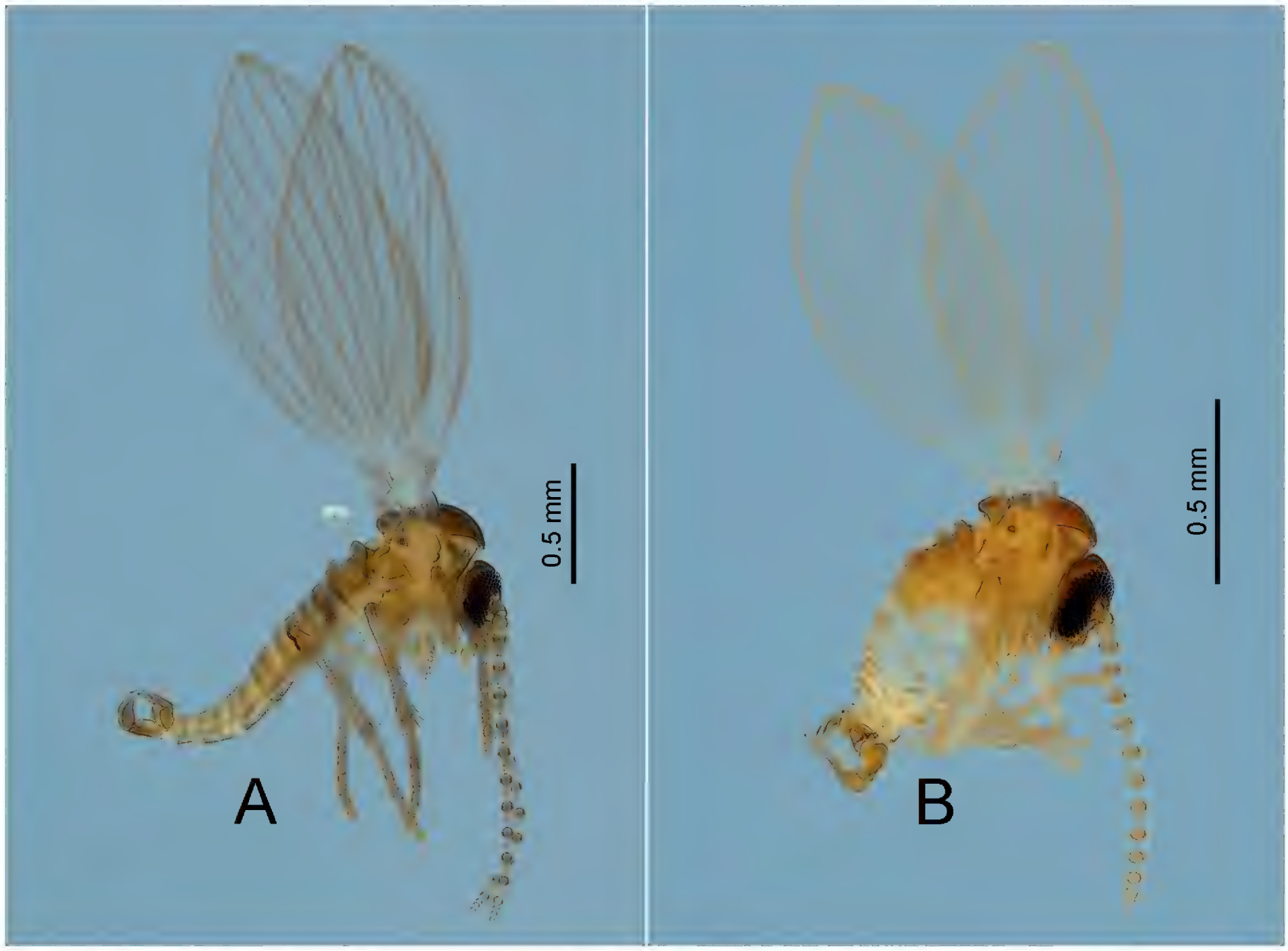

Figure 3. Lateral habitus of Estonian moth flies: the tribe Psychodini **A** *Psychodocha cinerea* (Banks, 1894) **B** *Psychodula minuta* (Banks, 1894).

***32. *Psychodocha gemina* (Eaton, 1904)**

Material examined. Saaremaa • ♂; Ruhnu Island, near Korsi farm; 57°48'28"N, 23°14'32"E; 03.08.–11.09.2011; TWT (on dead *Fraxinus excelsior*); IS leg. **Läänemaa** • ♂; Vormsi Island, Suuremõisa Park; 58°59'30"N, 23°11'34"E; 06.07.–19.07.2011; TWT (on *Quercus robur*); IS leg.; • ♂; Puise; 58°47'45"N, 23°31'22"E; 11.07.–14.08.2009; TWT (on old *Betula pendula*); IS leg.; • ♂; Puise; 58°47'41"N, 23°31'28"E; 17.06.–11.07.2009; TWT (on dead *Alnus incana* with *Fomitopsis pinicola*); IS leg. **Pärnumaa** • ♂; Riimaru; 58°16'18"N, 25°11'02"E; 13.07.–03.08.2005; TWT (on dead *Betula pendula* with *Fomes fomentarius*); IS leg. **Lääne-Virumaa** • ♂; Lahemaa NP, near Laukasoo; 59°28'49"N, 25°54'24"E; 23.05.–23.06.2017; TWT (on dead *Populus tremula*); IS leg.; • ♂♂; near Lasila, forest patch No 104; 59°16'43"N, 26°17'07"E; 20.09.–21.10.2015, 28.07.–29.08.2016; MT, OK leg.; • ♂♂; near Lasila, forest patch No 24; 59°16'27"N, 26°11'44"E; 05.–31.05.2016, 31.05.–28.06.2016, 28.07.–29.08.2016; MT; OK leg.; • ♂; near Lasila, forest patch No 31; 59°15'48"N, 26°14'17"E; 31.05.–28.06.2016; MT; OK leg.; • ♂♂; near Lasila, forest patch No 50; 59°16'25"N, 26°14'02"E; 05.–31.05.2016, 31.05.–28.06.2016, 28.06.–28.07.2016, 29.08.–26.09.2016; MT; OK leg.; • ♂; near Lasila, forest patch No 52; 59°16'20"N, 26°13'52"E; 29.08.–26.09.2016; MT; OK leg.; • ♂; near Lasila, forest patch No 6; 59°15'41"N, 26°12'32"E;

28.07.–29.08.2016; MT; OK leg.; • ♂; near Lasila, forest patch No 7; 59°15'33"N, 26°12'42"E; 29.08.–26.09.2016; MT; OK leg.; • ♂; near Lasila, forest patch No 75; 59°16'49"N, 26°13'05"E; 05.–31.05.2016, 28.07.–29.08.2016; MT; OK leg.; • ♂♂; near Lasila, forest patch No 79; 59°16'37"N, 26°13'22"E; 05.–31.05.2016, 28.06.–28.07.2016, 28.07.–29.08.2016, 29.08.–26.09.2016; MT; OK leg.; • ♂; Tudusoo NR; 59°04'47"N, 26°45'38"E; 27.07.–29.08.2017; TWT; IS leg. **Ida-Virumaa** • ♂; Muraka NR; 59°05'22"N, 27°09'18"E; 30.04.–14.05.2015; TWT (on dead *Picea abies*); IS leg. **Jõgevamaa** • ♂; Kääpa NR; 58°38'58"N, 26°51'12"E; 15.07.–31.07.2013; TWT (on dead *Pinus sylvestris*); IS leg. **Tartumaa** • ♂; Padakõrve NR; 58°35'07"N, 27°01'09"E; 15.06.–30.06.2015; TWT (on dead *Pinus sylvestris*); IS leg.; • ♂; Rootsiküla; 58°37'14"N, 27°10'47"E; 10.05.–06.06.2009; TWT (on dead *Salix caprea*); IS leg.; • ♂♂; Vorbuse, Lokaatorite tee; 58°25'27"N, 26°35'47"E; 30.04.–14.05.2023, 14.05.–29.05.2023, 10.06.–25.06.2023; MT; OK leg. **Põlvamaa** • ♂; Ihamaru NR; 58°06'11"N, 26°55'55"E; 13.–31.08.2015; TWT (on dead *Betula pendula*); IS leg. **Valgamaa** • ♂♂; Soontaga; 58°00'03"N, 26°05'31"E; 11.05.–05.06.2015, 05.06.–06.07.2015, 06.07.–03.08.2015; TWT (on *Acer platanoides*); IS leg.; • ♂; Soontaga NR; 58°01'19"N, 26°04'01"E; 28.07.–31.08.2015; TWT (on old *Quercus robur*); IS leg.; • ♂; Koiva wooded meadow; 57°41'26"N, 26°11'06"E; 14.05.–03.06.2013; TWT (on *Quercus robur*); IS leg.; • ♂; Koiva wooded meadow; 57°41'21"N, 26°11'08"E; 16.06.–02.07.2013; TWT (on dead *Quercus robur*); IS leg.; • ♂; Koivakonnu; 57°35'28"N, 26°19'21"E; 17.08.–01.09.2013; TWT (on dead *Quercus robur*); IS leg.

Comments. European and Transcaucasian species (Ježek et al. 2019, 2020, 2021a).

*33. *Psychodula minuta* (Banks, 1894)

Fig. 3B

Material examined. Pärnumaa • ♂; Kihnu Island; 58°07'49"N, 24°00'15"E; 22.05.–11.06.2012; TWT (on *Quercus robur*); IS leg.; • ♂; Laulaste NR; 57°59'23"N, 24°33'15"E; 18.–31.08.2013; TWT (on dead *Pinus sylvestris*); IS leg.; • ♂; Laulaste NR; 57°59'49"N, 24°33'30"E; 17.06.–03.07.2013; TWT (on *Pinus sylvestris*); IS leg.; • ♂; Laulaste NR; 57°59'35"N, 24°33'35"E; 18.07.–02.08.2013; TWT (on *Betula pendula*); IS leg. **Lääne-Virumaa** • ♂; near Lasila, forest patch No 104; 59°16'43"N, 26°17'07"E; 29.08.–26.09.2016; MT; OK leg.; • ♂; near Lasila, forest patch No 31; 59°15'48"N, 26°14'17"E; 20.09.–21.10.2015; MT; OK leg.; • ♂; near Lasila, forest patch No 50; 59°16'25"N, 26°14'02"E; 28.07.–29.08.2016; MT; OK leg.; • ♂♂; near Lasila, forest patch No 79; 59°16'37"N, 26°13'22"E; 12.–30.05.2015, 20.09.–21.10.2015; MT; OK leg. **Ida-Virumaa** • ♂; Agusalu NR; 59°02'16"N, 27°39'35"E; 30.05.–15.06.2015; TWT (on dead *Pinus sylvestris*); IS leg.; • ♂; Agusalu NR; 59°02'17"N, 27°39'40"E; 29.07.–14.08.2015; TWT (on dead *Pinus sylvestris*); IS leg. **Jõgevamaa** • ♂; Kääpa NR; 58°38'58"N, 26°51'12"E; 15.–31.07.2013; TWT (on dead *Pinus sylvestris*); IS leg.; • ♂; Kääpa NR; 58°39'01'N, 26°51'09"E; 15.08.–04.09.2013; TWT (on *Pinus sylvestris*); IS leg. **Valgamaa** • ♂; Soontaga; 58°00'03"N, 26°05'31"E; 05.06.–06.07.2015; TWT (on *Acer platanoides*); IS leg.

Comments. Holarctic species (Ježek et al. 2019, 2020, 2023b).

*34. *Tinearia alternata* (Say, 1824)

Material examined. Saaremaa • ♀; Ruhnu Island; 57°48'20"N, 23°14'33"E; 07.08.–05.09.2012; TWT (on dead *Alnus glutinosa*); IS leg. **Läänemaa** • ♀; Vormsi Island; 58°58'33"N, 23°12'10"E; 03.08.–01.09.2012; TWT (on dead *Betula pendula*); IS leg. **Pärnumaa** • ♀; Kihnu Island, Lemsi; 58°07'49"N, 24°00'15"E; 06.08.–13.09.2011; TWT (on old *Quercus robur*); IS leg.; • ♀; Kihnu Island; 58°08'28"N, 23°58'47"E; 12.07.–09.08.2012; TWT (on *Pinus sylvestris*); IS leg.; • ♂♀; Riimaru; 58°16'18"N, 25°11'02"E; 03.–17.08.2005, 31.07.–02.09.2006; TWT (on *Populus tremula*); IS leg. **Tartumaa** • ♂; Tartu, Aardla 124; 58°21'10"N, 26°41'08"E; 13.05.2016; hand picked; T. Kesküla leg.

Comments. Cosmopolitan species (Ježek et al. 2019, 2020, 2023b).

*35. *Ypsydocha setigera* (Tonnoir, 1922)

Material examined. Lääne-Virumaa • ♀; near Lasila, forest patch No 50; 59°16'25"N, 26°14'02"E; 28.07.–29.08.2016; MT; OK leg.; INS 33821.

Comments. A very common Holarctic species (Ježek and Omelková 2012).

Pericomaini

*36. *Clytocerus* (*Boreoclytocerus*) *longicorniculatus* Krek, 1987

Material examined. Lääne-Virumaa • ♂; near Lasila, forest patch No 79; 59°16'37"N, 26°13'22"E; 12.–30.05.2015; MT; OK leg.

Comments. A species known only from Europe (Ježek et al. 2020). Important species for nature conservation, assessed as nationally scarce in the Czech Republic.

37. *Clytocerus* (*Boreoclytocerus*) *ocellaris* (Meigen, 1804)

Fig. 4B

Published record. Salmela and Piirainen (2005): 304.

Material examined. Saaremaa • ♂♂; Ruhnu Island, Holma; 57°48'02"N, 23°13'42"E; 29.06.–02.08.2011, 07.08.–05.09.2012; TWT (on old *Ulmus laevis* with *Polyporus squamosus*); IS leg.; • ♂; Ruhnu Island, near Korsi farm; 57°48'28"N, 23°14'32"E; 03.08.–11.09.2011; TWT (on dead *Fraxinus excelsior*); IS leg.; • ♂; Ruhnu Island; 57°48'15"N, 23°14'32"E; 07.08.–05.09.2012; TWT (on *Acer platanoides*); IS leg.; • ♂; Ruhnu Island; 57°48'24"N, 23°15'16"E; 07.08.–05.09.2012; TWT (on dead *Salix caprea*); IS leg. **Läänemaa** • ♂; Vormsi Island, Suuremõisa park; 58°59'30"N, 23°11'34"E; 06.07.–03.08.2012; TWT (on *Quercus robur*); IS leg.; • ♂; Vormsi Island; 59°01'01"N, 23°12'18"E; 03.08.–01.09.2012; TWT (on *Pinus sylvestris*); IS leg. **Pärnumaa** • ♂; Kihnu Island; 58°06'59"N, 23°59'38"E; 12.07.–09.08.2012; TWT (on old *Quercus robur*); IS leg.; • ♂; Kihnu Island; 58°07'49"N, 24°00'15"E; 22.05.–11.06.2012; TWT (on old *Quercus robur*); IS leg.; • ♂♂; Matsalu NP; 58°42'41"N, 23°41'19"E; 29.05.–17.06.2009, 11.07.–14.08.2009; TWT (on *Populus tremula*); IS leg.;

• ♂; Matsalu NP; 58°42'52"N, 23°41'23"E; 11.07.–14.08.2009; TWT (on dead *Populus tremula*); IS leg.; • ♂; Puhtu; 58°33'31"N, 23°33'08"E; 18.06.–10.07.2009; TWT (on dead *Picea abies*); IS leg.; • ♂; Sookuninga NR; 58°00'08"N, 24°52'38"E; 21.05.–22.06.2017; TWT (on dead *Populus tremula*); IS leg. **Harjumaa** • ♂; Mähuste near Koitjärve; 59°24'55"N, 25°36'45"E; 30.07.–15.08.2015; TWT (on dead *Betula pendula*); IS leg. **Lääne-Virumaa** • ♂♂; near Lasila, forest patch No 24; 59°16'27"N, 26°11'44"E; 24.08.–20.09.2015, 05.–31.05.2016, 28.07.–29.08.2016, 29.08.–26.09.2016, 26.09.–27.10.2016; MT; OK leg.; • ♂♂; near Lasila, forest patch No 31; 59°15'48"N, 26°14'17"E; 12.–30.05.2015, 02.07.–02.08.2015, 24.08.–20.09.2015, 28.07.–29.08.2016, 26.09.–27.10.2016; MT; OK leg.; • ♂♂; near Lasila, forest patch No 50; 59°16'25"N, 26°14'02"E; 12.05.–30.05.2015, 29.08.–26.09.2016; MT; OK leg.; • ♂♂; near Lasila, forest patch No 52; 59°16'20"N, 26°13'52"E; 28.07.–29.08.2016, 29.08.–26.09.2016; MT; OK leg.; • ♂♂; near Lasila, forest patch No 6; 59°15'41"N, 26°12'32"E; 28.07.–29.08.2016, 29.08.–26.09.2016; MT; OK leg.; • ♂♂; near Lasila, forest patch No 75; 59°16'49"N, 26°13'05"E; 12.–30.05.2015, 20.09.–21.10.2015, 05.–31.05.2016, 28.07.–29.08.2016; MT; OK leg.; • ♂♂; near Lasila, forest patch No 79; 59°16'37"N, 26°13'22"E; 02.–24.08.2015, 24.08.–20.09.2015, 05.–31.05.2016, 31.05.–28.06.2016, 28.06.–28.07.2016; MT; OK leg.; • ♂; Suigu NR; 59°09'01"N, 26°49'08"E; 26.07.–29.08.2017; TWT (on *Populus tremula*); IS leg.; • ♂; Suigu NR; 59°09'11"N, 26°49'10"E; 26.07.–29.08.2017; TWT (on dead *Populus tremula*); IS leg.; INS 33808; • ♂; Tudusoo NR; 59°04'47"N, 26°45'38"E; 27.07.–29.08.2017; TWT (on *Populus tremula*); IS leg.; • ♂; Tudusoo NR; 59°04'53"N, 26°46'15"E; 26.07.–29.08.2017; TWT (on *Populus tremula*); IS leg. **Ida-Virumaa** • ♂; Muraka NR; 59°10'50"N, 27°09'44"E; 25.05.–26.06.2017; TWT (on *Populus tremula*); IS leg. **Tartumaa** • ♂; Rootsiküla; 58°37'14"N, 27°10'47"E; 15.07.–02.08.2009; TWT (on dead *Salix caprea*); IS leg. **Valgamaa** • ♂♂; Soontaga; 58°00'04"N, 26°05'15"E; 05.06.–06.07.2015, 03.–31.08.2015; TWT (on dead *Betula pendula*); IS leg.; • ♂♂; Soontaga; 58°00'04"N, 26°05'11"E; 07.05.–05.06.2015, 05.06–06.07.2015, 03.–31.08.2015; TWT (on dead *Betula pendula* with *Fomes fomentarius*); IS leg.; • ♂♂; Soontaga; 58°00'01"N, 26°05'10"E; 19.05.–05.06.2015, 06.07–03.08.2015; TWT (on dead *Populus tremula*); IS leg.; • ♂♂; Koiva wooded meadow; 57°41'21"N, 26°11'12"E; 02.–17.07.2013, 17.08.–01.09.2013; TWT (on dead *Populus tremula*); IS leg.; • ♂; Koiva wooded meadow; 57°41'19"N, 26°10'59"E; 14.05.–03.06.2013; TWT (on dead *Quercus robur*); IS leg.; • ♂; Koivakonnu; 57°35'27"N, 26°19'40"E; 14.05.–03.06.2013; TWT (on dead *Betula pendula* with *Fomes fomentarius*); IS leg.

Comments. European species (Ježek et al. 2019, 2020; Morelli and Biscaccianti 2021).

*38. *Clytocerus* (*Boreoclytocerus*) *splendidus* Ježek & Hájek, 2007

Material examined. Saaremaa • ♂; Ruhnu Island; 57°48'01"N, 23°14'38"E; 07.08.–05.09.2012; TWT (on *Acer platanoides*); IS leg.; • ♂; Ruhnu Island; 57°48'06"N, 23°13'58"E; 07.08.–05.09.2012; TWT (on *Sorbus intermedia* with *Laetiporus sulphureus*); IS leg.; • ♂; Ruhnu Island; 57°48'09"N, 23°14'25"E; 07.08.–05.09.2012; TWT (on *Fraxinus excelsior*); IS leg.; • ♂; Ruhnu Island;

57°48'10"N, 23°14'24"E; 07.08.–05.09.2012; TWT (on *Fraxinus excelsior*); IS leg.; • ♂; Ruhnu Island, Holma; 57°48'02"N, 23°13'42"E; 07.06.–10.07.2012; TWT (on old *Ulmus laevis*); IS leg. **Läänemaa** • ♂♂; Vormsi Island, 58°59'26"N, 23°11'51"E; 08.05.–04.06.2012, 06.07.–03.08.2012; TWT (on *Salix fragilis*); IS leg.; • ♂; Vormsi Island; 59°01'20"N, 23°08'13"E; 09.05.–04.06.2012; TWT (on dead *Alnus glutinosa*); IS leg. **Pärnumaa** • ♂; Kihnu Island; 58°08'07"N, 23°58'20"E; 09.08.–08.09.2012; TWT (on *Pinus sylvestris* with *Phellinus pini*); IS leg. **Lääne-Virumaa** • ♂; near Lasila, forest patch No 24; 59°16'27"N, 26°11'44"E; 12.–30.05.2015; MT; OK leg.; • ♂♂; near Lasila, forest patch No 31; 59°15'48"N, 26°14'17"E; 12.–30.05.2015, 02.07.–02.08.2015, 02.–24.08.2015, 20.09.–21.10.2015; MT; OK leg.; • ♂; near Lasila, forest patch No 50; 59°16'25"N, 26°14'02"E; 24.08.–20.09.2015; MT; OK leg.; • ♂; near Lasila, forest patch No 75; 59°16'49"N, 26°13'05"E; 02.–24.08.2015; MT; OK leg. **Tartumaa** • ♂; Rootsiküla; 58°37'14"N, 27°10'47"E; 15.07.–02.08.2009; TWT (on dead *Salix caprea*); IS leg.; INS 33809. **Valgamaa** • ♂; Koiva wooded meadow; 57°41'21"N, 26°11'12"E; 17.07.–01.08.2013; TWT (on dead *Populus tremula*); IS leg.

Comments. Not common European species (Ježek et al. 2018, 2019; Kroča and Ježek 2019). Important species for nature conservation, assessed as nationally scarce in the Czech Republic.

39. *Clytocerus* (*Boreoclytocerus*) *tetracorniculatus* Wagner, 1977

Published record. Salmela and Piirainen (2005): 304.

Comments. Not common European species (Kroča and Ježek 2019). Important species for nature conservation, assessed as critically endangered in the Czech Republic.

*40. *Pericoma albomaculata* Wahlgren, 1904

Note. Junior synonymous name: *Pneumia rivularis* (Berdén, 1954), see Kvifte et al. (2020).

Material examined. Saaremaa • ♂; Ruhnu Island, near Korsi farm; 57°48'28"N, 23°14'32"E; 26.05.–28.06.2011; TWT (on dead *Fraxinus excelsior*); IS leg.; • ♂; Ruhnu Island; 57°47'59"N, 23°14'34"E; 07.06.–10.07.2012; TWT (on dead *Fraxinus excelsior*); IS leg.; • ♂; Ruhnu Island; 57°48'01"N, 23°14'38"E; 07.06.–10.07.2012; TWT (on *Acer platanoides*); IS leg.; • ♂; Ruhnu Island; 57°48'15"N, 23°14'32"E; 07.06.–10.07.2012; TWT (on *Acer platanoides*); IS leg. **Läänemaa** • ♂; Vormsi Island, Suuremõisa Park; 58°59'30"N, 23°11'34"E; 06.06.–06.07.2011; TWT (on old *Quercus robur*); IS leg. **Pärnumaa** • ♂; Matsalu NP, 58°42'41"N, 23°41'19"E; 11.07.–14.08.2009; TWT (on *Populus tremula*); IS leg.; • ♂; Kalita NR; 58°04'15"N, 24°51'37"E; 25.07.–24.08.2017; TWT (on *Populus tremula*); IS leg. **Lääne-Virumaa** • ♂♂; near Lasila, forest patch No 31; 59°15'48"N, 26°14'17"E; 12.–30.05.2015, 02.07.–02.08.2015; MT; OK leg.; • ♂; near Lasila, forest patch No 50; 59°16'25"N, 26°14'02"E; 12.–30.05.2015; MT; OK leg.; • ♂; near Lasila, forest patch No 79; 59°16'37"N, 26°13'22"E; 30.05.–02.07.2015; MT; OK leg.; • ♂; Tudusoo NR; 59°04'47"N, 26°45'38"E; 28.05.–25.06.2017; TWT;

IS leg.; • ♂; Tudusoo NR; 59°04'53"N, 26°46'15"E; 27.05.–25.06.2017; TWT (on *Populus tremula*); IS leg.; INS 33781. **Ida-Virumaa** • ♂; Muraka NR, Mädamänniku; 59°07'07"N, 27°13'08"E; 25.05.–26.06.2017; TWT (on dead *Populus tremula*); IS leg.; INS 33799.

Comments. We follow the latest formal interpretation of this species by Kvifte et al. (2020). However, we consider the synonymy provided above questionable. As addressing it is beyond the scope of this paper, we postpone a detailed discussion to a future work. A Palaearctic species (Ježek et al. 2019) assessed as endangered in Czech Republic, but found to be common in Finland (Salmela et al. 2007; Salmela 2008).

*41. *Pneumia compta* (Eaton, 1893)

Material examined. Lääne-Virumaa • ♂; near Lasila, forest patch No 79; 59°16'37"N, 26°13'22"E; 30.05.–02.07.2015; MT; OK leg. **Ida–Virumaa** • ♂; Agusalu NR; 59°04'16"N, 27°37'40"E; 14.05.–30.05.2015; TWT (on dead *Betula pendula* with *Fomes fomentarius*); IS leg.; INS 33805.

Comments. A Palaearctic species (Oboňa and Ježek 2014; Ježek et al. 2019; Morelli and Biscaccianti 2022). Important species for nature conservation, assessed as nationally scarce in the Czech Republic.

42. *Pneumia mutua* (Eaton, 1893)

Published record. Salmela and Piirainen (2005): 304.

Comments. European species (Ježek et al. 2019).

*43. *Pneumia nubila* (Meigen, 1818)

Fig. 4A

Material examined. Saaremaa • ♂; Ruhnu Island; 57°47'59"N, 23°14'34"E; 26.05.–28.06.2011; TWT (on dead *Fraxinus excelsior*); IS leg.; • ♂; Ruhnu Island; 57°48'15"N, 23°14'32"E; 07.08.–05.09.2012; TWT (on *Acer platanoides*); IS leg.; • ♂; Ruhnu Island; 57°48'18"N, 23°14'27"E; 07.08.–05.09.2012; TWT (on *Quercus robur*); IS leg. **Läänemaa** • ♂; Puise; 58°47'45"N, 23°31'22"E; 17.06.–11.07.2009; TWT (on old *Betula pendula*); IS leg. **Pärnumaa** • ♂; Matsalu NP, 58°42'52"N, 23°41'23"E; 29.05.–17.06.2009; TWT (on dead *Populus tremula*); IS leg. **Harjumaa** • ♂; Lahemaa NP, Palanselja; 59°32'44"N, 25°39'31"E; 26.07.–26.08.2017; TWT (on burned *Pinus sylvestris*); IS leg.; • ♂; Põhja-Kõrvemaa NR; 59°25'30"N, 25°39'11"E; 15.05.–01.06.2015; TWT (on dead *Pinus sylvestris*); IS leg. **Lääne-Virumaa** • ♂; Lahemaa NP, near Laukasoo; 59°28'49"N, 25°54'24"E; 25.07.–26.08.2017; TWT (on dead *Populus tremula*); IS leg. **Tartumaa** • ♂; Elva-Vitipalu PL; 58°10'49"N, 26°25'14"E; 27.04.–13.05.2015; TWT (on dead *Picea abies*); IS leg.

Comments. Common European species (Ježek et al. 2019, 2020, 2021b), known also from Transcaucasia (Ježek et al. 2023a).

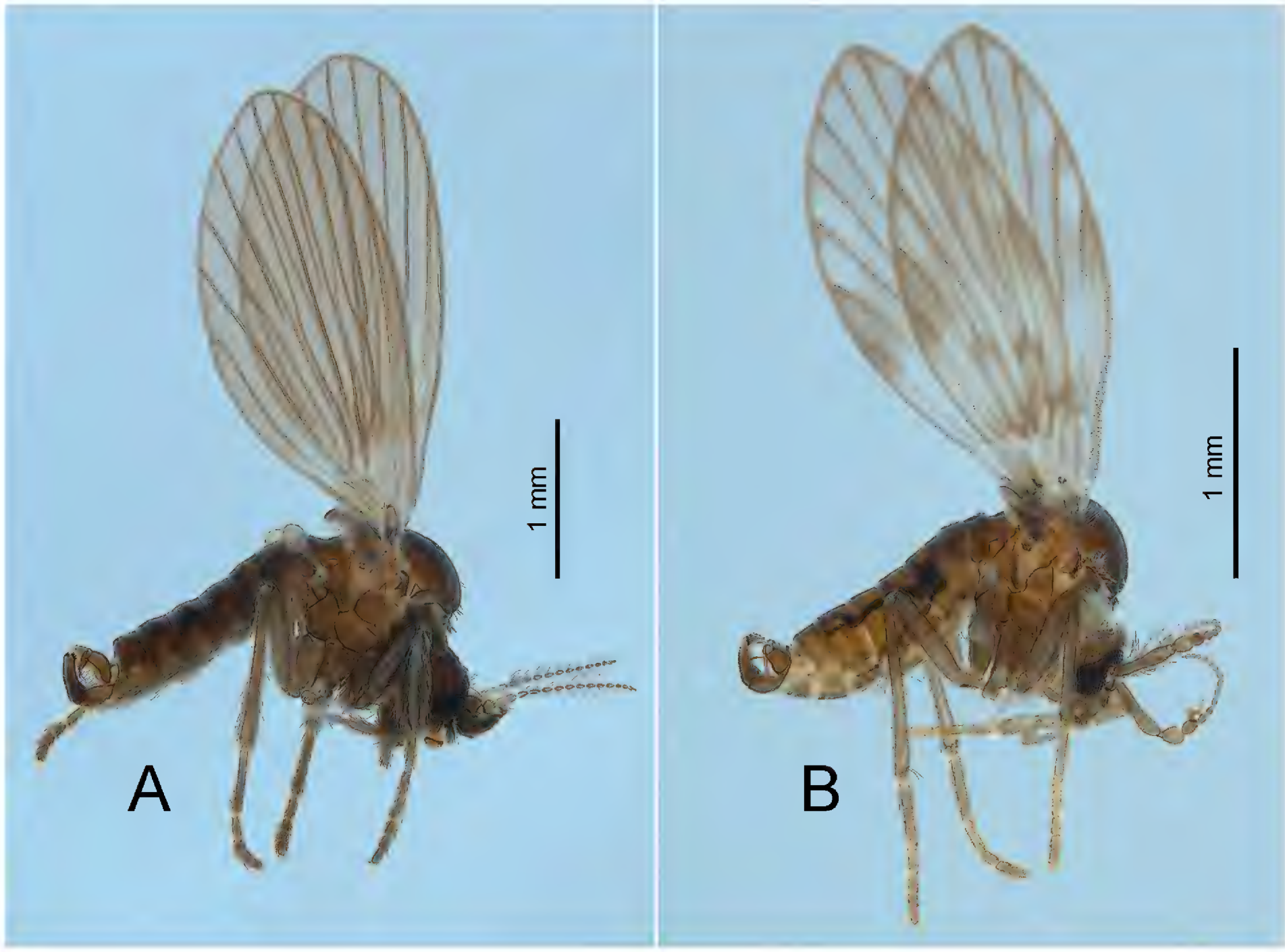

Figure 4. Lateral habitus of Estonian moth flies: the tribe Pericomaini **A** *Pneumia nubila* (Meigen, 1818) **B** *Clytocerus* (*Boreoclytocerus*) *ocellaris* (Meigen, 1804).

***44. *Pneumia trivialis* (Eaton, 1893)**

Material examined. Saaremaa • ♂♂; Ruhnu Island; 57°47'59"N, 23°14'34"E; 03.08.–11.09.2011, 07.08.–05.09.2012; TWT (on dead *Fraxinus excelsior*); IS leg. **Pärnumaa** • ♂; Matsalu NP; 58°42'41"N, 23°41'19"E; 29.05.–17.06.2009; TWT (on *Populus tremula*); IS leg. **Valgamaa** • ♂; Soontaga NR; 58°00'23"N, 26°03'19"E; 13.05.–29.05.2015; TWT (on dead *Picea abies*); IS leg.; • ♂; Soontaga NR; 58°01'19"N, 26°04'01"E; 29.05.–29.06.2015; TWT (on old *Quercus robur*); IS leg.

Comments. European and Transcaucasian species (Ježek et al. 2019, 2020, 2021a, 2023a).

***45. *Tonnoiriella nigricauda* (Tonnoir, 1919)**

Material examined. Pärnumaa • ♂; Matsalu NP; 58°42'41"N, 23°41'19"E; 29.05.–17.06.2009; TWT (on *Populus tremula*); IS leg. **Lääne-Virumaa** • ♂; near Lasila, forest patch No 79; 59°16'37"N, 26°13'22"E; 28.06.–28.07.2016; MT; OK leg.; INS 33791. **Valgamaa** • ♂; Soontaga; 58°00'04"N, 26°05'11"E; 05.06.–06.07.2015; TWT (on dead *Betula pendula* with *Fomes fomentarius*); IS leg.;

• ♂; Soontaga; 58°00'04"N, 26°05'15"E; 03.08.–31.08.2015; TWT (on dead *Betula pendula*); IS leg.; • ♂; Soontaga; 58°00'03"N, 26°05'31"E; 06.07.–03.08.2015; TWT (on *Acer platanoides*); IS leg.

Comments. European species (Kvifte et al. 2011; Wagner 2018; Ježek et al. 2019). Important species for nature conservation, assessed as critically endangered in the Czech Republic.

Discussion

Given the limited knowledge regarding moth fly diversity in the Baltic region, the discovery of 30 new country records in Estonia comes as no surprise. The majority of the recorded species (31 of 45; original data combined with Salmela and Piirainen (2005)) have been collected only from 1–3 localities (including 16 from a single locality), emphasizing the urgent need for further study. Conversely, seven recorded species are more widespread, having been collected from more than ten localities. Currently, a total of 71 species are documented in the Baltic countries (Table 1), while 63 species are known from Finland (including two of them marked as questionable; Salmela et al. 2014). The only species known from Latvia, *Clytocerus* (*B.*) *ocellaris*, is widely distributed in Europe as well as in the Nordic-Baltic region (Ježek and Goutner 1995).

When comparing the species lists of Lithuania, Estonia, and Finland, it is noteworthy that all countries have a remarkable proportion of unique species (Fig. 5). Considering this, it is highly likely that the number of species documented in Estonia will continue to increase. Eleven species, which are known to inhabit both Lithuania and Finland (as depicted in Fig. 3), could potentially also be found in Estonia, as there appear to be no apparent limits to their distribution. Interestingly, the genus *Ulomyia* Walker, 1856, which is known from three species in Lithuania, is absent from records in Estonia. It is possible that conducting more intensive research on the surrounding water ecosystems, including both flowing and standing water, could help fill this gap.

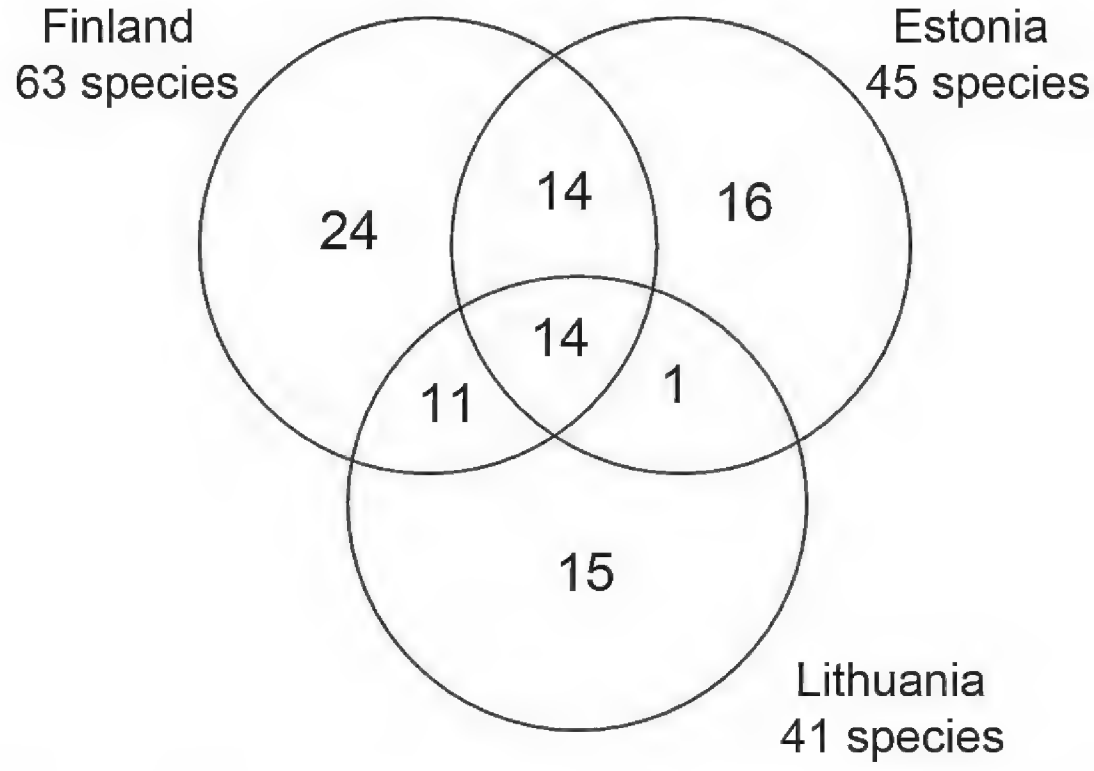

Figure 5. Comparison of the species diversity of moth flies in Estonia, Lithuania, and Finland. The numbers represent recorded species.

Table 1. An updated systematic list of the psychodids of the Baltic Countries. Lithuanian data are derived from Pakalniškis et al. (2006) and Latvian data from Salmela and Vartija (2007).

Species	Estonia	Latvia	Lithuania
Sycorax silacea Haliday in Curtis, 1839	x		
Trichomyia urbica Haliday in Curtis, 1839	x*		
Oomormia andrenipes (Strobl, 1910)	x*		
Lepimormia hemiboreale Salmela & Piirainen, 2005	x		
Promormia eatoni (Tonnoir, 1940)	x*		
Lepiseodina rothschildi (Eaton, 1912)	x*		x
Lepiseodina tristis (Meigen, 1830)			x
Panimerus albifacies (Tonnoir, 1919)	x		
Panimerus goetghebueri (Tonnoir, 1919)			x
Panimerus notabilis (Eaton, 1893)	x*		
Parajungiella consors (Eaton, 1893)	x		x
Parajungiella longicornis (Tonnoir, 1919)	x*		
Parajungiella pseudolongicornis (Wagner, 1975)	x		
Parajungiella serbica (Krek, 1985)	x*		
Paramormia (*Paramormia*) *polyascoidea* (Krek, 1971)	x		
Paramormia (*Phyllotelmatoscopus*) *decipiens* (Eaton, 1893)			x
Peripsychoda auriculata (Haliday in Curtis, 1839)	x		
Peripsychoda fusca (Macquart, 1826)			x
Psycmera integella (Jung, 1956)			x
Seoda britteni (Tonnoir, 1940)			x
Seoda carthusiana (Vaillant, 1972)	x		
Seoda gressica (Vaillant, 1972)	x*		
Seoda labeculosa (Eaton, 1893)	x*		x
Seoda morula (Eaton, 1893)			x
Feuerborniella obscura (Tonnoir, 1919)	x		
Philosepedon (*Philosepedon*) *austriacum* Vaillant, 1974	x*		
Philosepedon (*Philosepedon*) *dumosum* Omelková & Ježek, 2012	x*		
Philosepedon (*Philosepedon*) *humerale* (Meigen, 1818)	x		x
Philosepedon (*Philothreticus*) *soljani* Krek, 1971	x*		
Philosepedon (*Trichosepedon*) *balkanicum* Krek, 1970	x*		
Threticus lucifugus (Walker, 1856)			x
Trichopsychoda hirtella (Tonnoir, 1919)	x*		
Apsycha pusilla (Tonnoir, 1922)			x
Chodopsycha buxtoni (Withers, 1988)	x*		
Chodopsycha lobata (Tonnoir, 1940)	x*		x
Copropsychoda brevicornis (Tonnoir, 1940)			x
Logima albipennis (Zetterstedt, 1850)	x		x
Logima satchelli (Quate, 1955)	x*		
Logima sigma (Kincaid, 1899)	x*		
Psycha grisescens (Tonnoir, 1922)			x
Psychoda phalaenoides (Linnaeus, 1758)	x		x

Species	Estonia	Latvia	Lithuania
Psychodocha cinerea (Banks, 1894)	x		x
Psychodocha gemina (Eaton, 1904)	x*		x
Psychodula minuta (Banks, 1894)	x*		x
Tinearia alternata (Say, 1824)	x*		x
Ypsydocha setigera (Tonnoir, 1922)	x*		x
Berdeniella manicata (Tonnoir, 1920)			x
Clytocerus (*Boreoclytocerus*) *longicorniculatus* Krek, 1987	x*		
Clytocerus (*Boreoclytocerus*) *ocellaris* (Meigen, 1804)	x	x	x
Clytocerus (*Boreoclytocerus*) *rivosus* (Tonnoir, 1919)			x
Clytocerus (*Boreoclytocerus*) *splendidus* Ježek & Hájek, 2007	x*		
Clytocerus (*Boreoclytocerus*) *tetracorniculatus* Wagner, 1977	x		
Parabazarella subneglecta (Tonnoir, 1922)			x
Pericoma (*Pachypericoma*) *blandula* Eaton, 1893			x
Pericoma (*Pericoma*) *albomaculata* Wahlgren, 1904	x*		
Pericoma (*Pericoma*) *diversa* Tonnoir, 1919			x
Pericoma (*Pericoma*) *trifasciata* (Meigen, 1804)			x
Pneumia canescens (Meigen, 1804)			x
Pneumia cubitospinosa (Jung, 1954)			x
Pneumia compta (Eaton, 1893)	x*		
Pneumia extricata (Eaton, 1893)			x
Pneumia mutua (Eaton, 1893)	x		x
Pneumia nubila (Meigen, 1818)	x*		x
Pneumia palustris (Meigen, 1804)			x
Pneumia pilularia (Tonnoir, 1940)			x
Pneumia trivialis (Eaton, 1893)	x*		
Tonnoiriella nigricauda (Tonnoir, 1919)	x*		
Tonnoiriella pulchra (Eaton, 1893)			x
Ulomyia annulata annulata (Tonnoir, 1919)			x
Ulomyia cognata (Eaton, 1893)			x
Ulomyia fuliginosa (Meigen, 1804)			x

* indicates a new country-record.

Sixteen Estonian species have a conservation status in Central Europe, particularly in the Czech Republic, including six species (viz. *T. urbica*, *O. andrenipes*, *P. pseudolongicornis*, P. *serbica*, *C.* (*B.*) *tetracorniculatus*, *T. nigricauda*) classified as critically endangered, three (viz. *P. eatoni*, *P. albomaculata*, *S. labeculosa*) as endangered, and seven (viz. *L. rothschildi*, *P.* (*P.*) *soljani*, *Ch. buxtoni*, *C.* (*B.*) *longicorniculatus*, *C.* (*B.*) *splendidus*, *P.* (*P.*) *dumosum*, *P. compta*) as nationally scarce. However, one species, *P. albomaculata*, considered endangered in the Czech Republic has been found to be very common in aquatic environments in Finland (Salmela et al. 2007; Salmela 2008), highlighting the importance of sampling across a wide range of habitats. Nevertheless, given that a significant proportion of the studied material was collected from protected areas in Estonia, the knowledge regarding the potential conservation status of these species can be applied in the country's nature protection management.

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Additional information

Conflict of interest

The authors have declared that no competing interests exist.

Ethical statement

No ethical statement was reported.

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Author contributions

Conceptualization: JO, OK. Data curation: JO, OK, IS. Investigation: JJ, JO, OK. Methodology: IS, OK, JO. Validation: JJ. Visualization: OK. Writing - original draft: OK, JO. Writing - review and editing: JJ, IS.

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Data availability

All of the data that support the findings of this study are available in the main text.

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